DIAMOND LOGIC® BUILDER SOFTWARE

User's Manual
Dealer (Level 2)
No Advanced Logic Programming

© 2006 International Truck and Engine Corporation
Printed in the United States of America

S08304 2/06

TABLE OF CONTENTS

SECTION 1 Introduction 4

SECTION 2 What is Multiplexing? 5

SECTION 3 What are the available components of the multiplexing system? 6

SECTION 4 What is the Diamond Logic® Builder program? 10

SECTION 5 How do I start the Diamond Logic® Builder software? 11

SECTION 6 How do I connect to the vehicle? 13

SECTION 7 How do I know if the connection between the computer and the vehicle is working correctly? 15

SECTION 8 How is the Diamond Logic® Builder software organized? 17

SECTION 9 How do I determine the vehicle's current configuration? 65

SECTION 9 How do I determine the vehicle's current configuration? 66

SECTION 10 How do I create and apply a template? 69

SECTION 11 How do I add or remove a feature? 76

SECTION 12 How do I change a programmable parameter? 82

SECTION 13 How do I change switch, gauge and pin-out configurations? 87

SECTION 14 How do I program a vehicle? 92

SECTION 15 How do I use the Diamond Logic® Builder software to diagnose electrical problems? 94

SECTION 16 How do I use Sessions and Triggers? 107

SECTION 17 How do I close the Diamond Logic® Builder program? 113

APPENDIX A –How do I install and uninstall the Diamond Logic® Builder software? 115

APPENDIX B – Acronyms 121

APPENDIX C – Contact Information 122

APPENDIX D – Do's and Don'ts 123

APPENDIX E – DLB support for CF Model Trucks? 124

APPENDIX F – DLB support of the AWARE SM Vehicle Intelligence Module 127

INDEX 130

SECTION 1 Introduction

In 2001 International Truck and Engine introduced the Industry's First High Performance Trucks®. With this introduction, a very innovative and flexible electrical system employing multiplexing technology was introduced. The system is standard on all high performance trucks. In addition, there are many options that can be ordered and/or added to the vehicle in the field.

The initial release of The Industry's First High Performance Truck® included two software tools used by service technicians. The ICAP software is used to program and/or re-configure the vehicle while the INTUNE® program is used to verify programming success and/or to diagnose electrical system problems.

As customers, dealers, body builders, suppliers and International engineers worked with this new multiplexed system, it was determined that a new software tool was necessary to fully utilize the many advantages and opportunities of the new vehicle electrical system. The main objective of this new software program is to provide the ability for end users to create their own logic-driven features to perform the control of body equipment.

The Diamond Logic® Builder software combines the feature creation, programming and diagnostic functions for the end user. This Diamond Logic® Builder User's Manual describes the new software in detail and shows how to use it to maximize the efficiency and effectiveness of The Industry's First High Performance Truck's® electrical system integration.

SECTION 2 What is Multiplexing?

Multiplexing is the concept of transmitting multiple unique electronic signals over a pair of wires. Multiplexing allows these two wires to carry electronic data that can control a variety of electronic equipment. The number of wires needed to connect components is greatly reduced, which offers better reliability and improved vehicle uptime.

Although limited multiplexing has been used previously by International, the introduction of The Industry's First High Performance Trucks® has fully exploited this technology. Multiplexing is used by the following systems:

SECTION 3 What are the available components of the multiplexing system?

The multiplexed electrical system on The Industry's First High Performance Trucks® consists of the following standard or optional components:

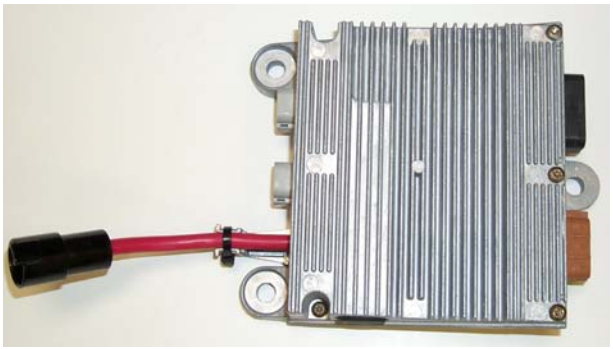
- Electrical System Controller
- Remote Power Module
- Remote Air Solenoid Module
- Electronic Gauge Cluster
- Rocker Switch Packs
- HVAC Controls
- Engine Controls
- Transmission Controls
- Anti-Lock Brakes

Electronic System Controller (ESC)

The Electrical System Controller is the main processor or "heart" of the multiplexed electronic system. It is mounted inside the cab under the dash near the kick panel on the driver's side. The ESC receives inputs from driver controls, sensors and switches providing outputs to vehicle loads, gauges, relays and remotely mounted modules. Software to control a vehicle's specific electrical/electronic features and components is programmed into the ESC using a computer and the Diamond Logic® Builder program.

Remote Power Module (RPM)

The Remote Power Module serves as the gateway into International's electrical system. This module can be used to control many different types of added body equipment with additional software. The base package for integration includes a module, which contains six 20-amp outputs, for controlling lights or other loads required for a vehicle's application (up to 80 amps total). Remote power modules may be controlled using pre-engineered features from International or customer developed features created using the Diamond Logic® Builder program. Remote Power Modules also include 6 inputs that provide programmable remote-switching capability.



Remote Air Solenoid Module (RASM or MSVA)

Through the development of a family of Remote Air Solenoid Modules, air accessory devices such as Horns, PTO's, Sliding Fifth Wheel Locks, Suspensions, Transfer Cases, Differential Locks, Power Divider Locks, Auxiliary Transmissions and Two-Speed Axles and more can be controlled by electric in-cab switches. Currently there are two types of Remote Air Modules, a four-channel and a seven-channel version (shown). Both are factory installed with in-cab switches.

Electronic Gauge Cluster (EGC)

The Electronic Gauge Cluster has a set of standard and optional gauges controlled by the ESC via a data link cable.

Rocker Switch Packs

The Rocker Switch Packs are provided in six and twelve switch modules. A variety of switches may be added or deleted. Diamond Logic® Builder software makes it easy to move and relocate switches.

HVAC Controls

An electronic module located in the center of the instrument panel controls the HVAC system. The new HVAC controls eliminate complexity by controlling functions such as the air temperature and air outlet selection with electronic motors, thereby eliminating the need for high maintenance control cables.

Engine Control System

The engine shares engine information such as RPM, vehicle speed, water temperature, oil temperature, etc. with any component connected to the data link that requires the information. The engine also receives commands for cruise control, clutch and brake status and engine fan control from the ESC.

Electronic Transmission Controls

The transmission controller communicates gear position, transmission oil temperature and warning light status with the electronic gauge cluster on the drive train J1939 data link.

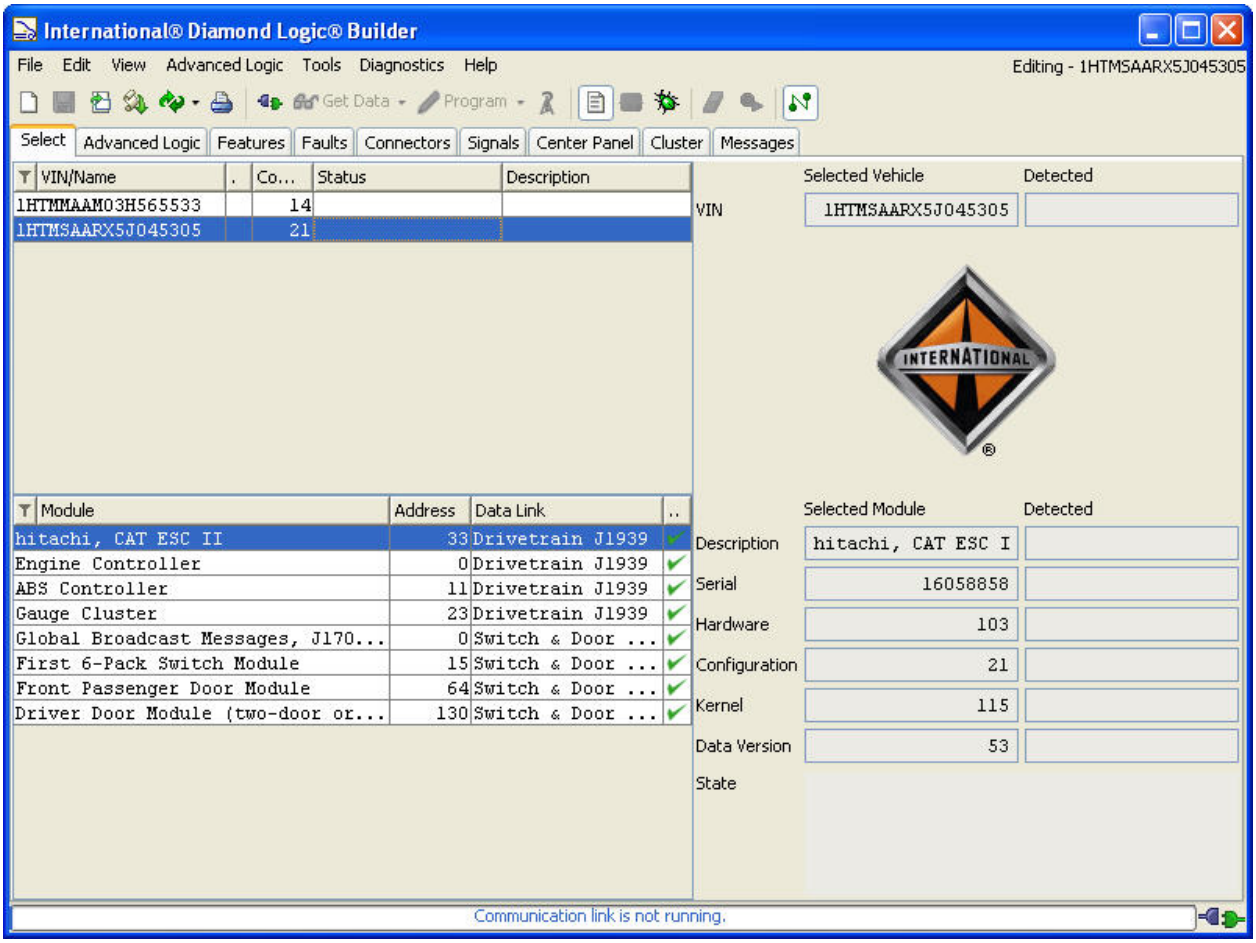
Anti-lock Brake System (ABS)

The Anti-lock Brake System prevents wheel lock-up during vehicle braking events. The system communicates with the ESC and the engine controller to limit engine torque, disable retarders and control the ABS, ATC and trailer ABS warning lamps in the electronic gauge cluster.

SECTION 4 What is the Diamond Logic® Builder program?

The International® Diamond Logic™ Builder software provides the ability to program, diagnose and simulate features in the Electrical System Controller (ESC) module on the Industry's First High Performance Trucks®. The Diamond Logic™ Builder program allows users to configure switches, the gauge cluster, and the parameters that are programmed in the ESC.

The Advanced Logic capability in DLB is covered in a separate manual. Advanced Logic provides the ability to write custom features beyond what is offered by the advertised feature codes. It is not usually offered at the Dealer Level and is primarily intended to be used by Body Builders. Dealers do have the ability to view Advanced Logic when it has been installed on a vehicle.



SECTION 5 How do I start the Diamond Logic® Builder software?

Locate the Diamond Logic® Builder program shortcut icon on your computer. The shortcut is located in the Vehicle Diagnostics folder on the Windows desktop.

Double click the Diamond Logic® Builder program icon to Start.

Diamond
Logic™ Builder

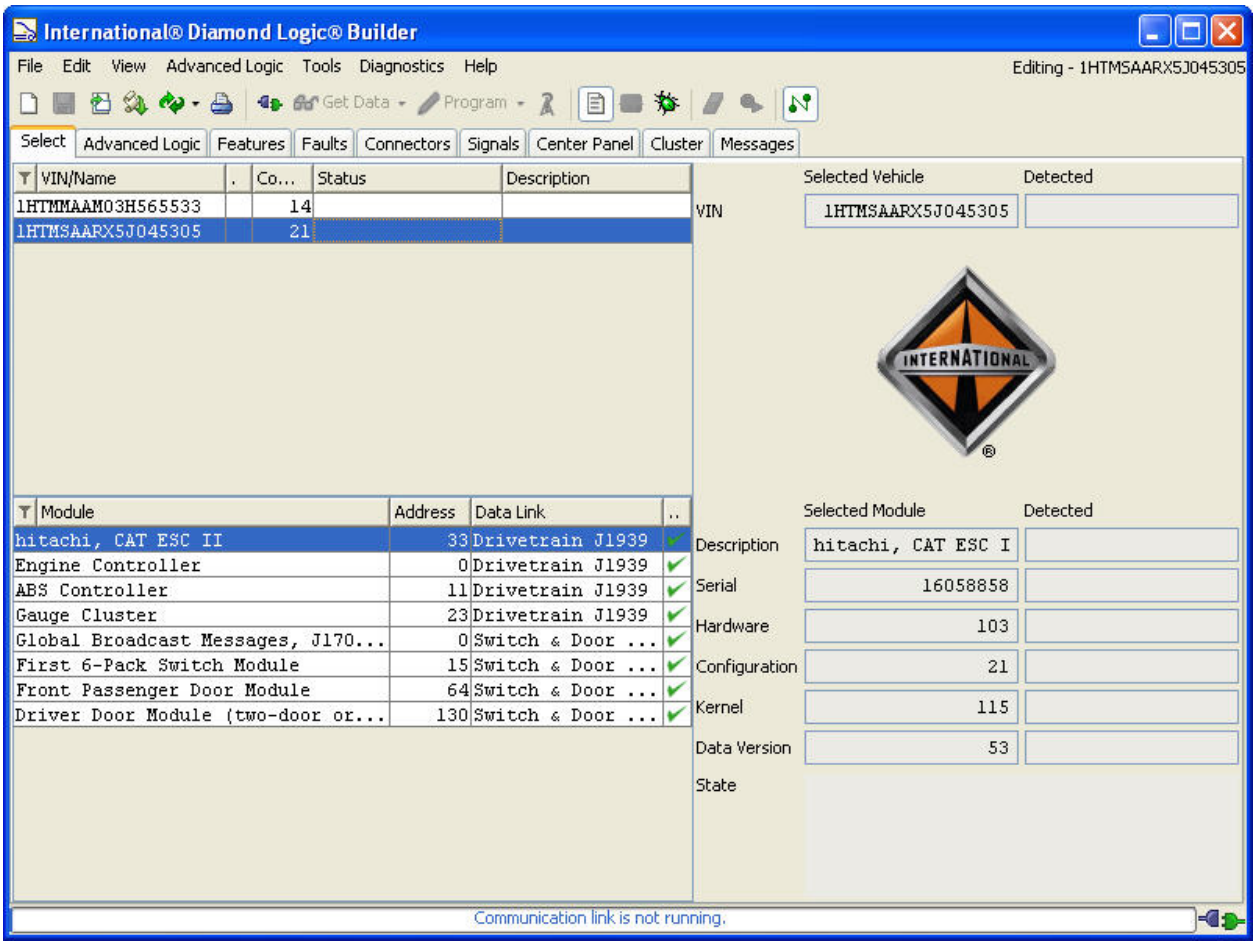
After a few moments, you'll see this logo.

NOTE: Depending on several variables (processor speed, system memory, updates), the load time can take a few minutes.

After a few moments the following International message will appear.

NOTE: It is possible the user will also see a brief notice that the software is updating. Software updates occur whenever they are available when the user starts the program while online.

When the Diamond Logic® Builder software is started, the main screen appears.



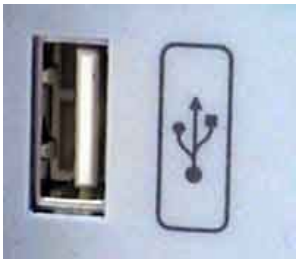
SECTION 6 How do I connect to the vehicle?

The computer is connected to the vehicle using the IC4 USB data link cable (part # ZTSE-4632-USB) or the IC4 COM data link cable (part # ZTSE-4729) along with the ATA adapter cable. One end of the ATA adapter cable connects to the box on the IC4 cable and the other, having a round 9pin connector, to the truck ATA port. On International vehicles the ATA port is located underneath the instrument panel on the driver's side.

ATA Port

The other end of the IC4 USB cable connects to a USB port on your computer.
The other end of the IC4 COM cable connects to a com port on your computer.

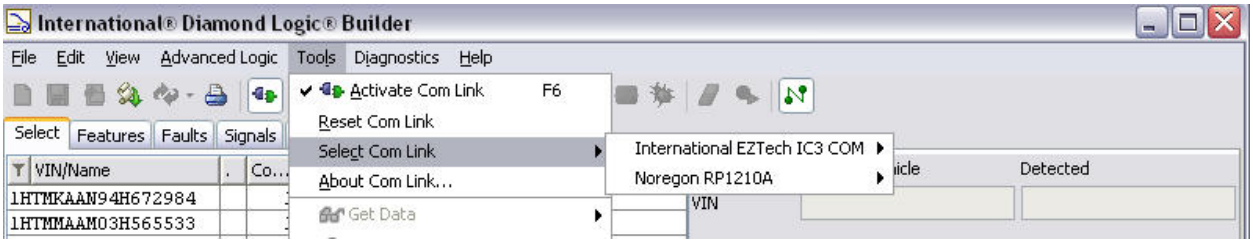
Your Computer



USB Connector

IC4 USB Cable

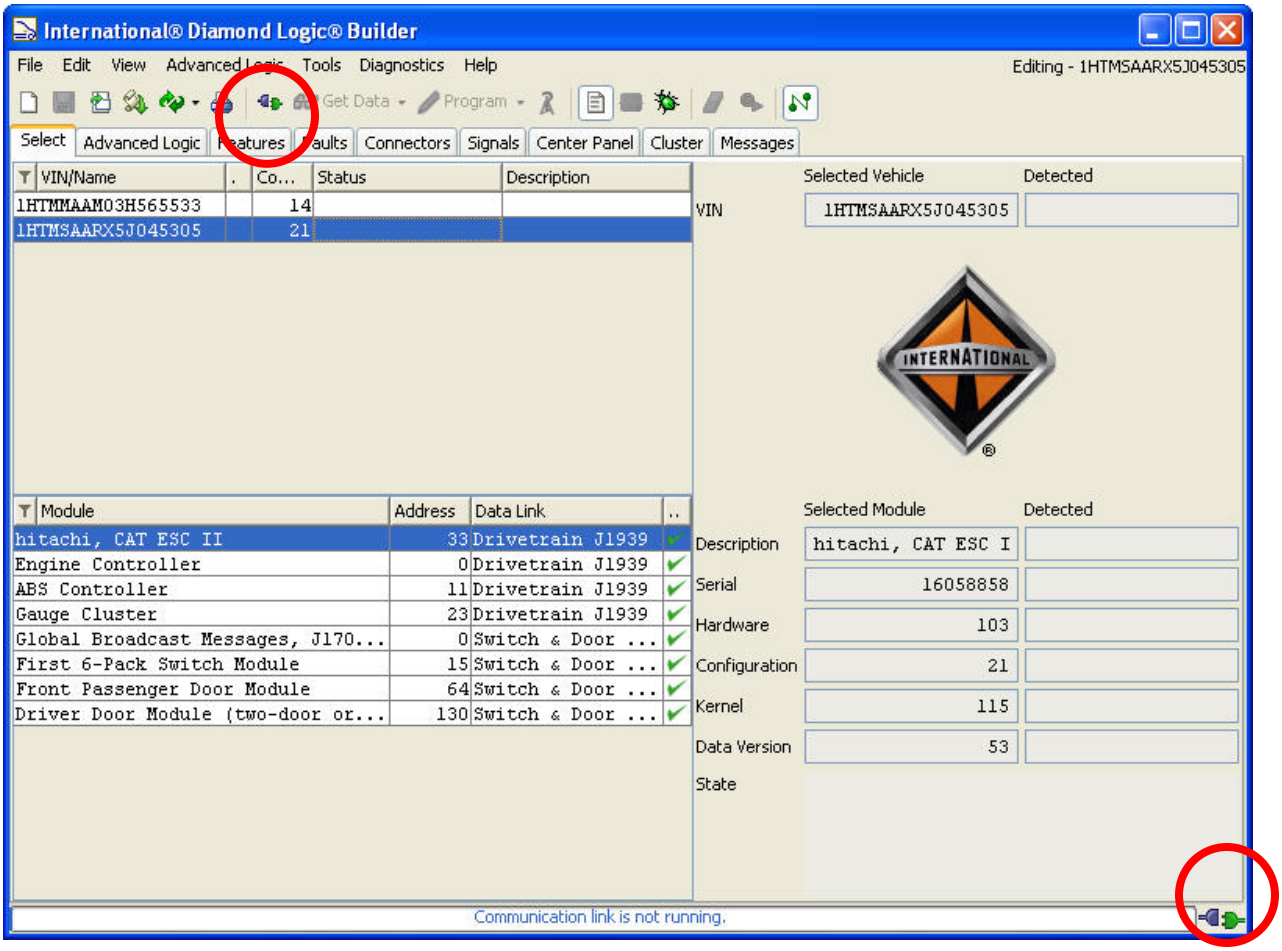
Although the IC4 USB and IC4 COM Interface cables are the only cables currently available from International, some facilities may have the older J1939 cable or IC3 Com cable. These older cables WILL work with the Diamond Logic® Builder program. The type of cable being used needs to be selected in the Diamond Logic® Builder program. In addition, the correct cable driver needs to be installed on the computer. The IC4 USB can only be used with Windows 2000® or Windows XP®.



NOTE: If communications problems are experienced with one of these cables, disconnect the cable from the truck, reconnect and try again. Pressing the F6 key, on the computer, will toggle between activating and de-activating the Com Link.

SECTION 7 How do I know if the connection between the computer and the vehicle is working correctly?

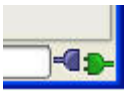
This section describes how to tell if the vehicle is connected correctly to the computer. Launch the Diamond Logic® Builder software and then connect the IC4 USB interface cable between the computer and the vehicle.



In the lower right corner of ANY of the Diamond Logic® Builder program screens is the Connect/Disconnect icon (shown above disconnected). The Connect / disconnect toolbar icon will also reflect the current connection status.

The icon as shown below indicates that the computer is properly connected and is communicating with the ESC in the vehicle.

If the computer is not connected or communicating with the ESC in the vehicle, it will appear as shown below.



NOTE: If the interface cable is connected correctly to the computer and this icon does not appear, check to ensure the correct cable is assigned to the COM port under the Tools menu. In addition, ensure the correct COM port has been selected and that the Com link is active.

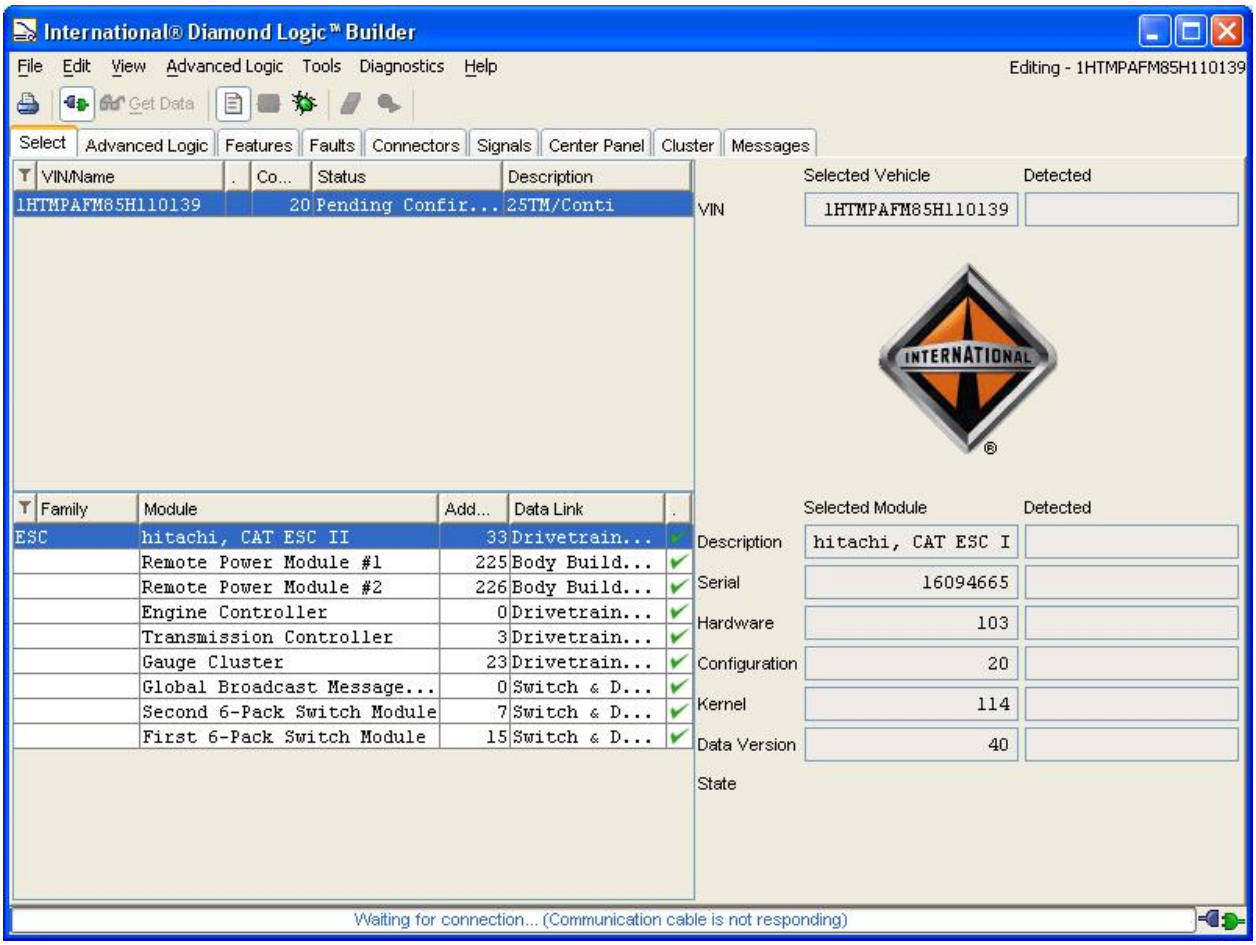
The J1939/CAN light, on the IC4 USB or COM Interface Cable, is red and the TX light flashes green when the cable is connected and functioning properly. If the Diamond Logic® Builder software does not show a “Connected Icon”, tap the F6 key on the computer. Communication with the truck should resume in a few seconds.

SECTION 8 How is the Diamond Logic® Builder software organized?

In this section the Dropdown Menus, Toolbars and Tabs will be briefly outlined. In subsequent sections, the various screens, buttons and functions will be described in detail.

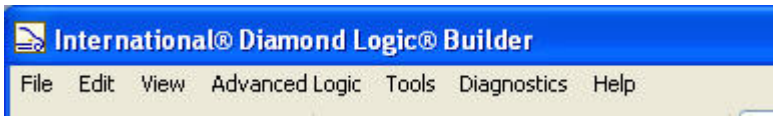
This is the main screen in the Diamond Logic® Builder program.

The main screen allows the user to diagnose the connected vehicle



Application Menu Bar

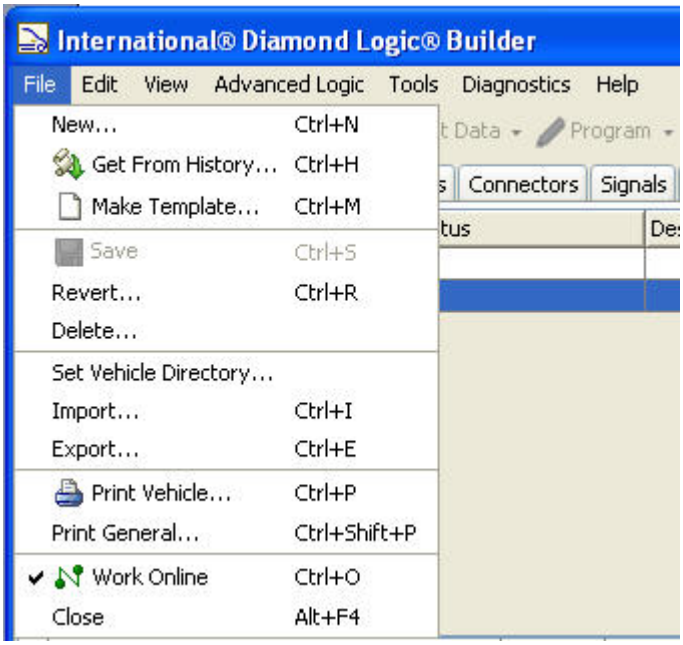
There are 7 Dropdown menus. The Menu Bar headings are listed and defined as follows.



Name	Description
File	Used to manage vehicle data.
Edit	Used to manipulate and edit vehicle data.
View	Used to view data from different perspectives.
Advanced Logic	Used to view any advanced logic programmed on the vehicle.
Tools	Used to manipulate data when connected to selected vehicle.
Diagnostics	Used to troubleshoot a vehicle
Help	Used to access the software help.

Each Menu Bar heading will be described in detail.

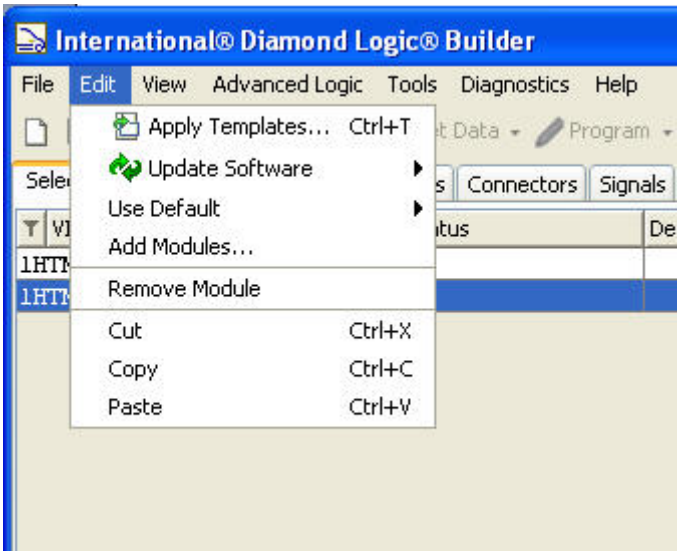
File Dropdown Menu



Name	Shortcut	Description
New	Ctrl+N	Open a menu to create a new template
Get From History	Ctrl+H	Opens a menu to request VIN file over the internet from International
Make Template	Ctrl+M	Allows operator to make a template from the selected VIN
Save	Ctrl+S	Allows operator to save changes made to a VIN
Revert…	Ctrl+R	Allows operator to undo changes and revert to a previously saved version of the VIN.
Delete		Delete the selected vehicles.
Set Vehicle Directory…		Sends the currently selected configurations to a directory of your choice.
Import…	Ctrl+I	Import vehicle file(s) from another directory or file.
Export	Ctrl+E	Export vehicle file(s) to another directory or file.
Print Vehicle…	Ctrl+P	Prints all vehicle parameters and information.
Print General…	Ctrl+Shift+P	Prints vehicle selection screen information.
Close	Alt+F4	Close this window.

Edit Dropdown Menu

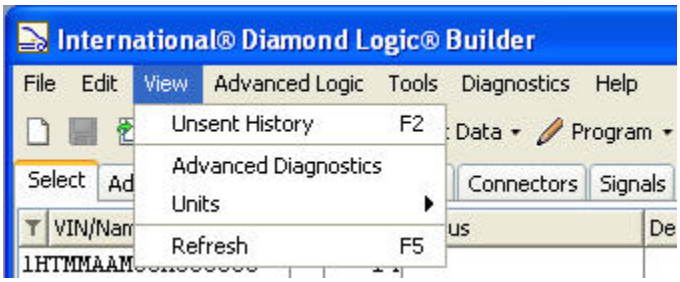
Edit allows the user to manipulate and edit data. The Edit Dropdown Menu is listed and defined as follows.



Name	Shortcut	Description
Apply Templates	Ctrl+T	Apply a template to a selected vehicle.
Update Software		Update international software features without any programmable parameter changes.
Use Default		Allows resetting of pin mapping, gauge location and switch mapping to default locations.
Add Modules		Add AWARE modules to the selected vehicles and templates
Cut	Ctrl+X	Same as normal editing function.
Copy	Ctrl+C	Same as normal editing function.
Paste	Ctrl+V	Same as normal editing function.

View Dropdown Menu

View allows the user to view additional data and/or change the units of the data. The View Dropdown Menu is listed and defined as follows.

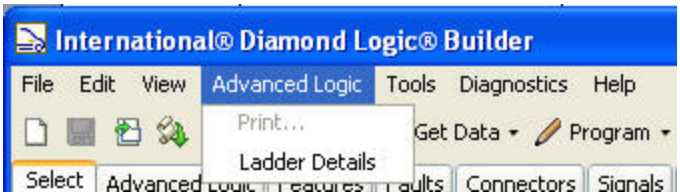


Name	Description
Unsent History	Lists all vehicle programming files that have not been sent to international.
Advanced Diagnostics	Show all vehicle signals in diagnostics.
Units	Allows selection of measurement system. • English: change measurement system units to English. • Metric: change measurement system units to metric.
Refresh	Re-read data and refresh screen display.

Advanced Logic Dropdown Menu

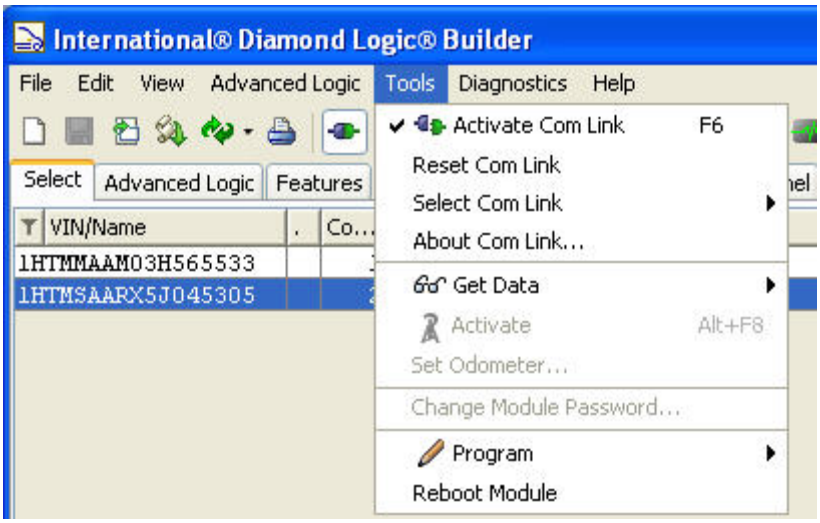
Advanced Logic allows the user to view logic blocks. Advanced Logic is active only when a logic block under the Advanced Logic Tab is selected. The Advanced Logic Menu is listed and defined as follows.

NOTE: Advanced Logic programming is available only to personnel trained and certified for this activity.



Name/Shortcut	Description
Print	Prints ladder logic and selected logic block.
Ladder Details	Show mapped signals on ladder.

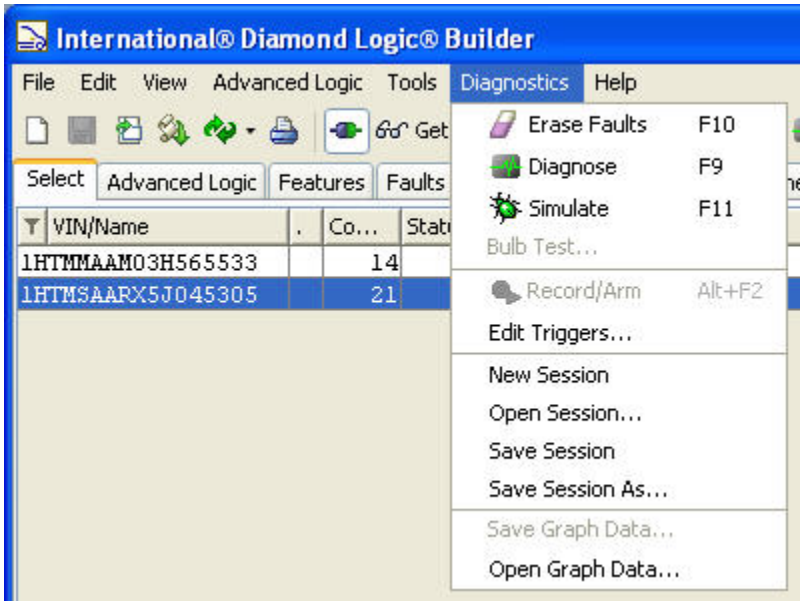
Tools Dropdown Menu



Name	Shortcut	Description
Activate Com Link	F6	Turn on/off continuous controller hardware scan on communications link.
Reset Com Link		Resets communication link without shutting down.
Select Com Link		Allows for the selection of a communications port to match selected cable.
About Com Link		Gives specific information of the communications port and the cable that is currently selected for use.
Get Data	F7	Read vehicle data from controller.
Activate		Used to activate the AWARE Module
Set Odometer		Program the current mileage into the gauge cluster.
Change Module Password		Not used at this time
Program	F8	Write selected vehicle configuration into controller.
Reboot Module		Allows a reboot of a module without disconnecting the power feed to the unit.

Diagnostics Dropdown Menu

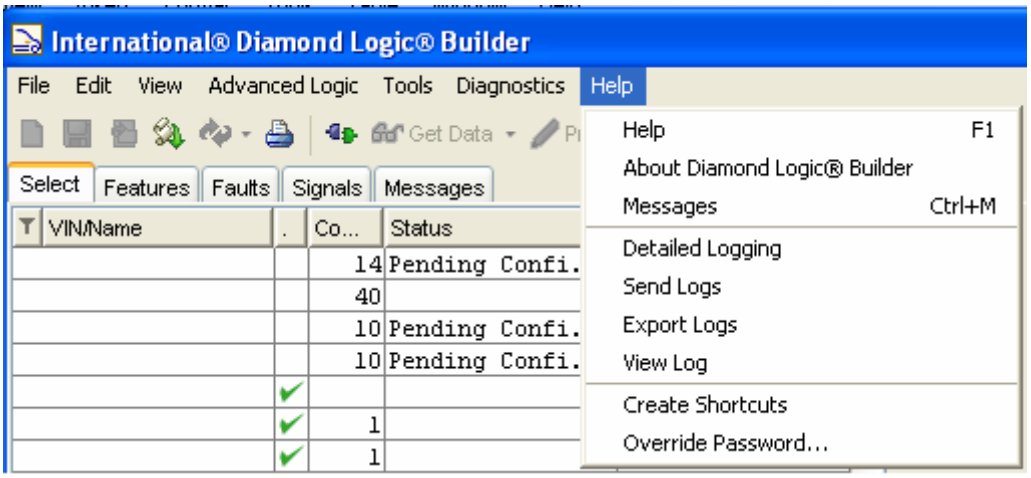
The Diagnostics Menu allows the user to diagnose a vehicle. Most diagnostic menus may be used only when the Diamond Logic® Builder program is placed in the diagnostic mode. The Diagnostic Menu is listed and defined as follows.



Name/Shortcut	Description
Erase Faults (F10)	Erases diagnostic faults.
Diagnose (F9)	Place DLB into Diagnostic Mode while connected to a vehicle.
Simulate (F11)	Place DLB into Simulate Mode. No vehicle connection required.
Bulb Test	Turn On / Off all ESC driven (not CF) gauge cluster warning lights.
Record / Arm	Start / Stop DLB Data Recorder.
Edit Triggers	Setup Signal triggers for recording.
New Sessions	Open a new signal recording session.
Open Session	Open an existing signal session.
Save Session	Save a signal session to the computer memory device.
Save Session As	Save a signal session as a specified file name.
Save Graph Data	Save recorded signal graph data to a specified file name.
Open Graph Data	Open a recorded signal graph data from a specified file.

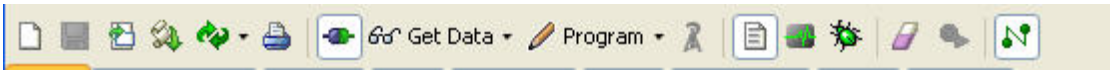
Help Dropdown Menu

Help allows the user to seek information about the program's terms and processes.



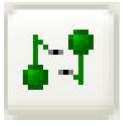
Name/Shortcut	Description
Help (F1)	Open Help function. Help includes: configuring vehicles, Advanced Logic, programming icon types, ladder logic, structured logic, units of measure and diagnostics.
Messages	Displays messages from the system when a user is online. These messages appear at login if they are not turned off on the message window.
About Diamond Logic® Builder	Show the Diamond Logic® Builder program version information.
Detailed Logging	Logging is only used by DLB engineering and should only be turned on when directed by engineering.
Send Logs	
Export Logs	
View Logs	
Create shortcuts	Create launch shortcuts to this copy of Diamond Logic Builder, If possible.
Override Password…	Allows users to program after the VIN or time since connecting to network limits have been exceeded. Call Vehicle Programming support, 18003364500 option 2 option 3, to obtain this password.

Toolbar



The Main Screen Toolbar at the top of the screen displays Icons that reflect many of the often-used functions embedded in the File Toolbar Dropdown Menus. The toolbar at the top of the screen displays 8 buttons with pictured icons that are shortcuts to some of the software's major functions. The Icons are listed and defined as follows.

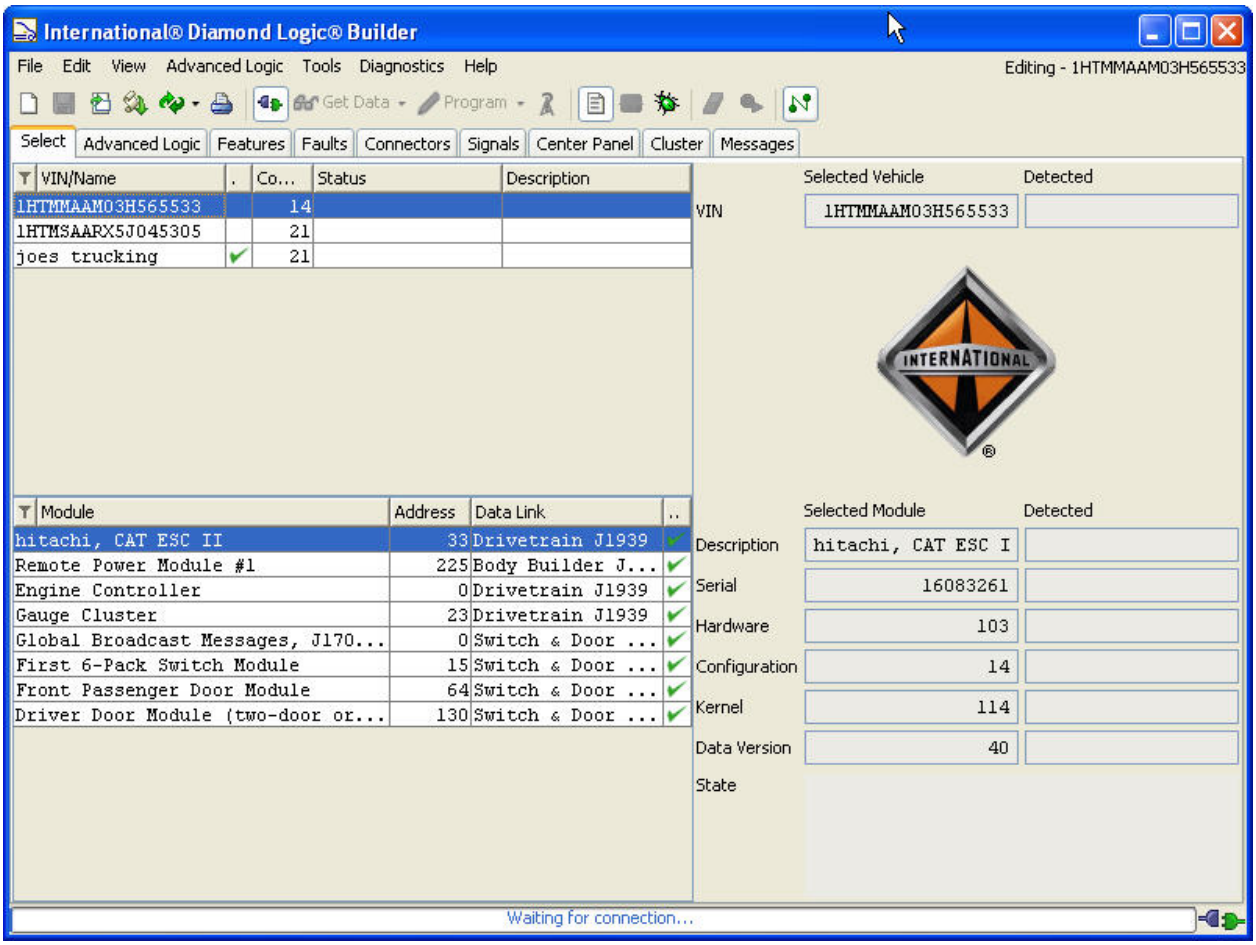
Icon	Description
	Create a new template.
	Save changes to selected vehicles.
	Apply configuration to selected vehicles.
	Get vehicle configuration from International.
	Update International® software features and kernel on selected vehicles without any application or programmable parameter changes.
	Print configuration for selected vehicle.
	Turn On/Off Continuous Controller Hardware Scan On Communications Link.

	Read vehicle data from controller.
	Write selected vehicle configuration into controller.
	Activate or Deactivate the AWARE Module
	Edit vehicle mode for the selected vehicle. Turns off Diagnostics or Simulate mode.
	Run diagnostics when controller is detected on communications link.
	Simulate mode for the selected vehicle configuration.
	Clear fault log and previously active faults from cluster.
	Start signal recorder when controller is detected on communications link.
	Go Online/Offline with the internet connection.

Tabs

Select Tab

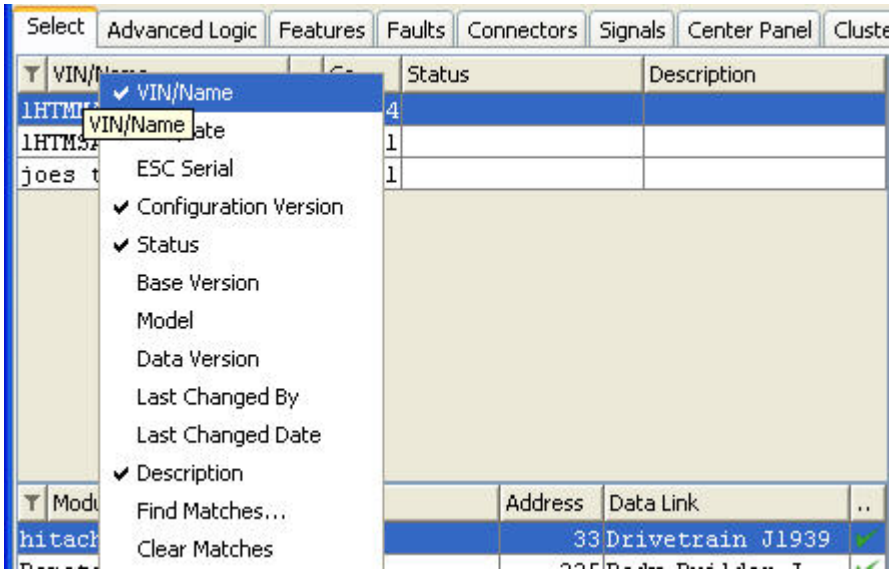
The Select Tab is shown by default when the program is started. This is the main page and is used to select the vehicle and to display relevant information. When using any of the other Tabs, the user can return to this main page by using the Select Tab.



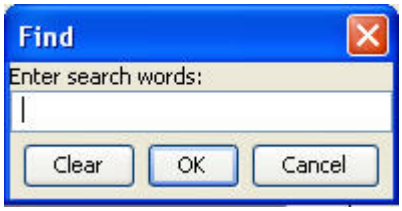
Select Tab Column Headings

Vehicle data is managed using the Select Tab screen.

Right-clicking the column headings will display a dropdown menu showing the column selections available. A check mark indicates the column is selected and will be displayed; - no check mark indicates the column is not selected and will not be displayed. This is true for all Tabs except Faults, Connectors, Center Panel and Cluster, which are data displays without selectable inputs.

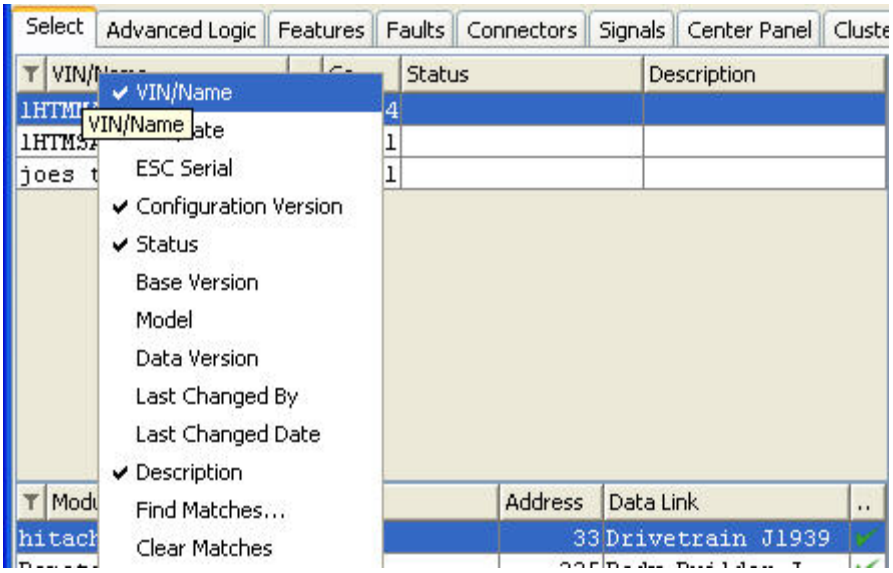


NOTE: Left-clicking the filter icon will open a search box that can be used to search for any words in the program or parameters.



Select Tab Column Headings Defined

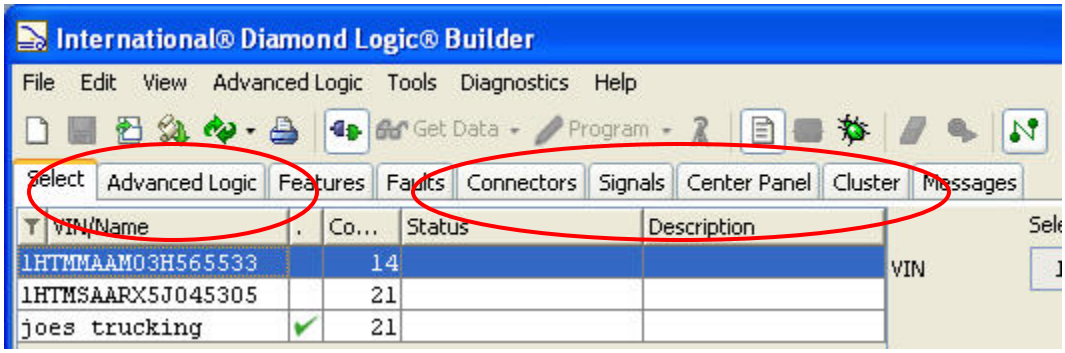
The top portion of the Select window has the following column headers available to the user. The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings. They are listed and defined as follows:



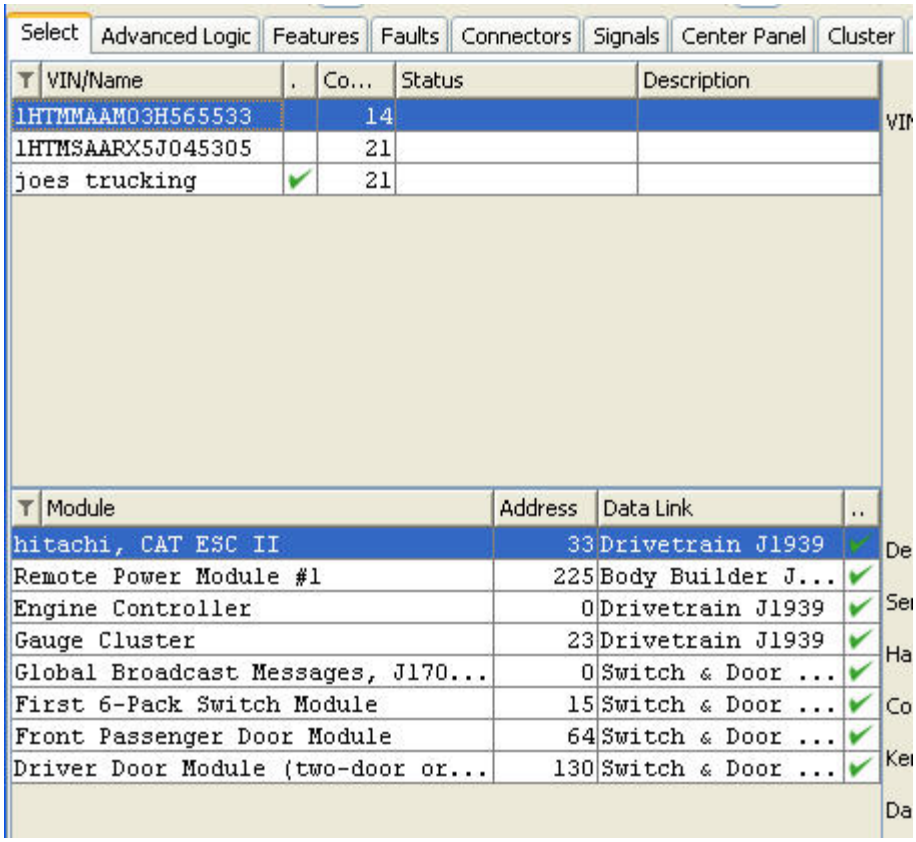
Name	Description
VIN	Vehicle identification number.
Template	Identifies this item as a template vs. An actual VIN.
ESC Serial	Displays The ESC Serial Number Either From History Or From The Installed ESC, Depending On The Source of the VIN.
Configuration Version	Number of times this VIN or template has been modified.
Status	Current status of the file, whether modified, unsaved, etc.
Base Revision	What revision the VIN started before the current configuration.
Model	Sales model of the vehicle.
Software Version	Software version tied to the file.
Last Changed By	Who modified the file last.
Last Change Date	When the file was last changed.
Find Matches	Use To Find Matches Anywhere On The Table And Bring Them To The Top Of The Screen. This is the same as left-clicking the Filter icon.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

Selecting A VIN

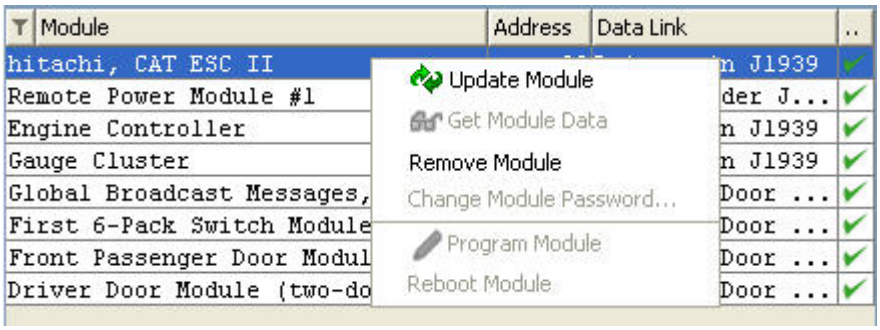
When a VIN is selected, the Advanced Logic, Connectors, Center Panel and Cluster tabs will appear.



In addition, when a VIN is selected, a list of the modules programmed on the vehicle will be displayed in the bottom part of the screen. When you are connected to a vehicle, this screen will display if the module is communicating with the ESC.



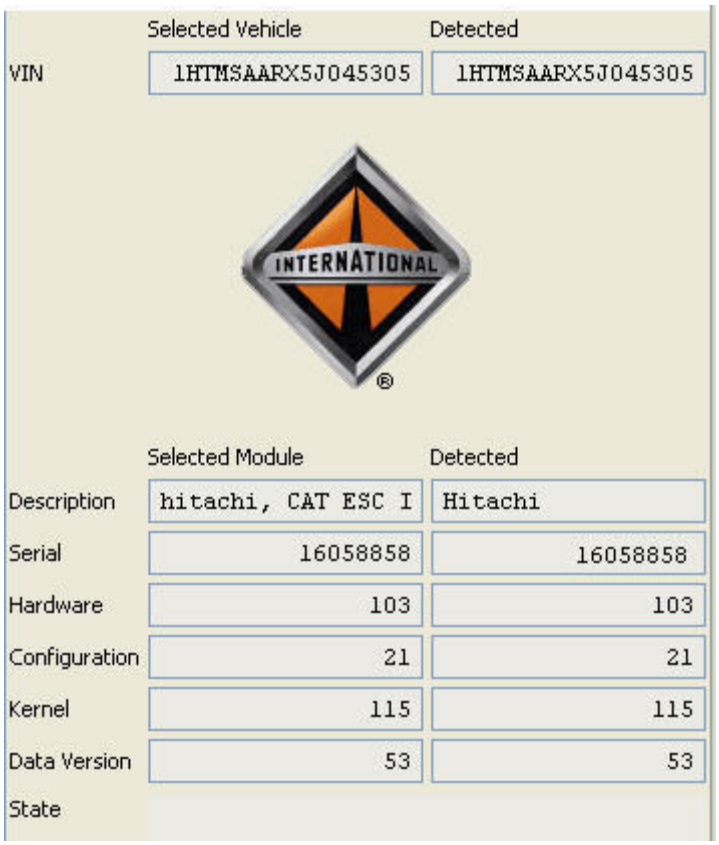
Right clicking on any of the modules will open a drop down menu that may provide additional options for that module. Options that are grayed out are not available for the selected module.



The headings are listed below.

Name	Description
Update Module	Update International software on the selected module.
Get Module Data	Read the selected vehicle configuration from all programmable modules.
Remove Module	Removes the selected module.
Change Module Password	Changes the module password (Only if the module has a password feature).
Program Module	Writes the current configuration to the selected module only.
Reboot Module	Reboots only the selected module operating program.

Additionally, when a VIN is selected, information about the selected vehicle populates the right side of the window. When you are connected to a vehicle, DLB will also display information about the detected ESC.



The headings are listed below.
Selected Vehicle -- Current Vehicle Selected.
Detected -- Current Vehicle Connected To DLB.

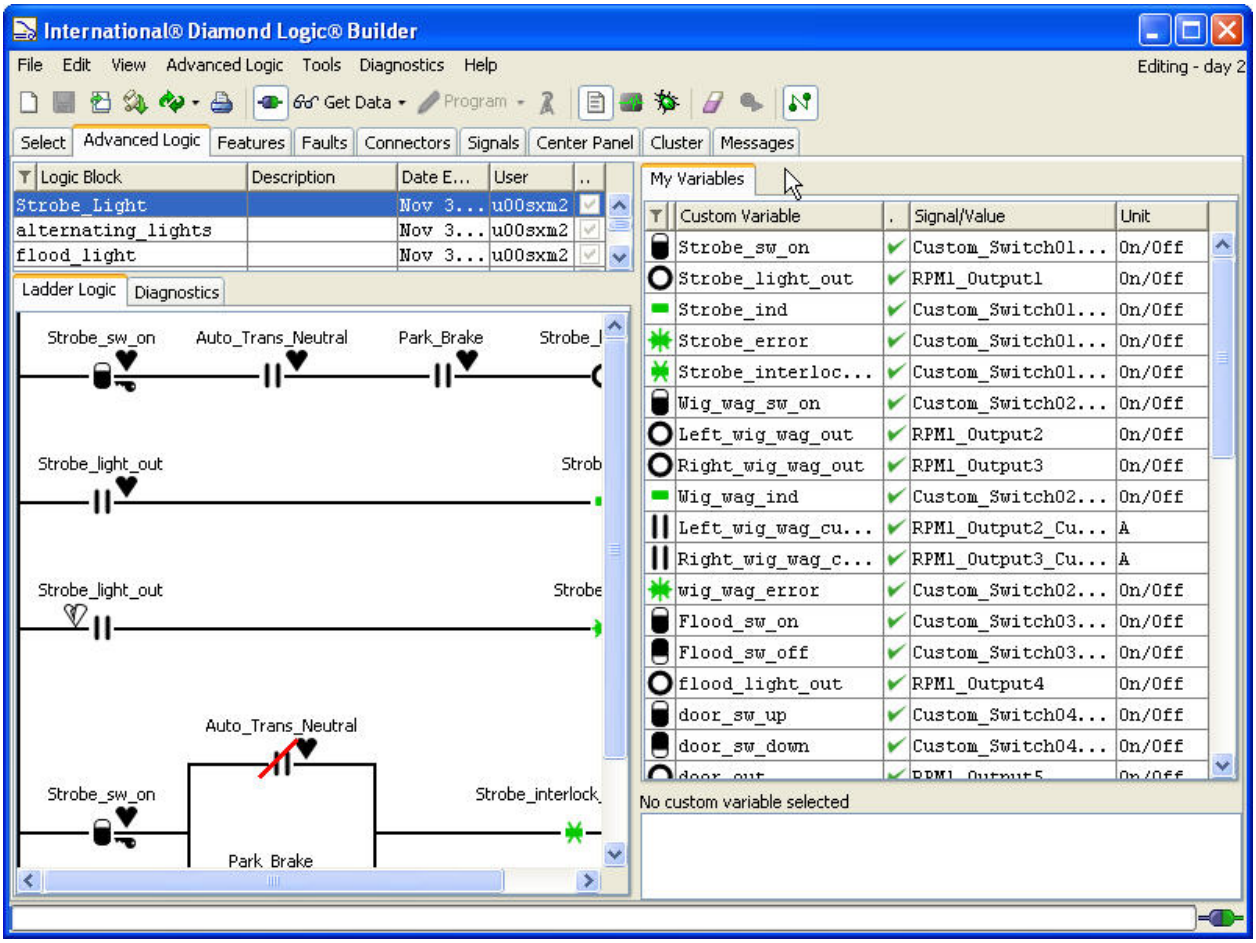
Name	Description
VIN	Vehicle Identification Number.
Description	ESC Processor Information
Serial	Electronic System Controller Serial number.
Hardware	Identifies the vintage of the ESC (a numeric value indicates whether the vintage is Infineon, Hitachi, ESC II or future development models).
Configuration	Number of times this VIN or template has been modified.
Kernel	Identifies the release version of the core program in the ESC.
Data Version	Release revision of software 595 codes.
State	Displays the State of the ESC (Ex: blank).

Advanced Logic Tab

This section will describe the Advanced Logic Tab and the screens associated with it.

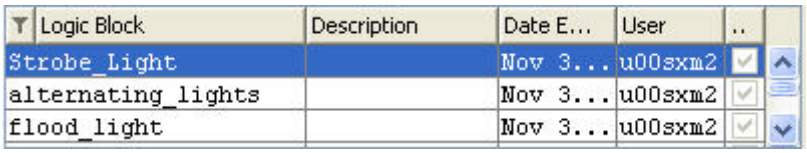
NOTE: Advanced Logic programming is not included in the Diamond Logic® Builder Software version

The Advanced Logic Tab allows users to view logic blocks. The screen has four main parts. At the upper right is the Advanced Logic List (described below). Below it is the display area. Shown is the most common display mode – Ladder Logic. At the upper left are the Variable Selection tabs (described below). Below the tabs are the variable listings.



Advanced Logic List

This area of the Advanced Logic screen allows the user to select which logic block the user will be programming or editing and lists all logic blocks of a selected vehicle or template. Selecting a Logic Block reveals its particular ladder logic in the display area below. Just below the Advanced Logic List are three buttons that allow the user to choose either the Ladder Logic view (as shown) or the Structured Logic view (for advanced programmers) and a Diagnostics button.



Advanced Logic List Column Headings

The headings under the Advanced Logic List Tab are selectable and the column widths are adjustable. The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings.

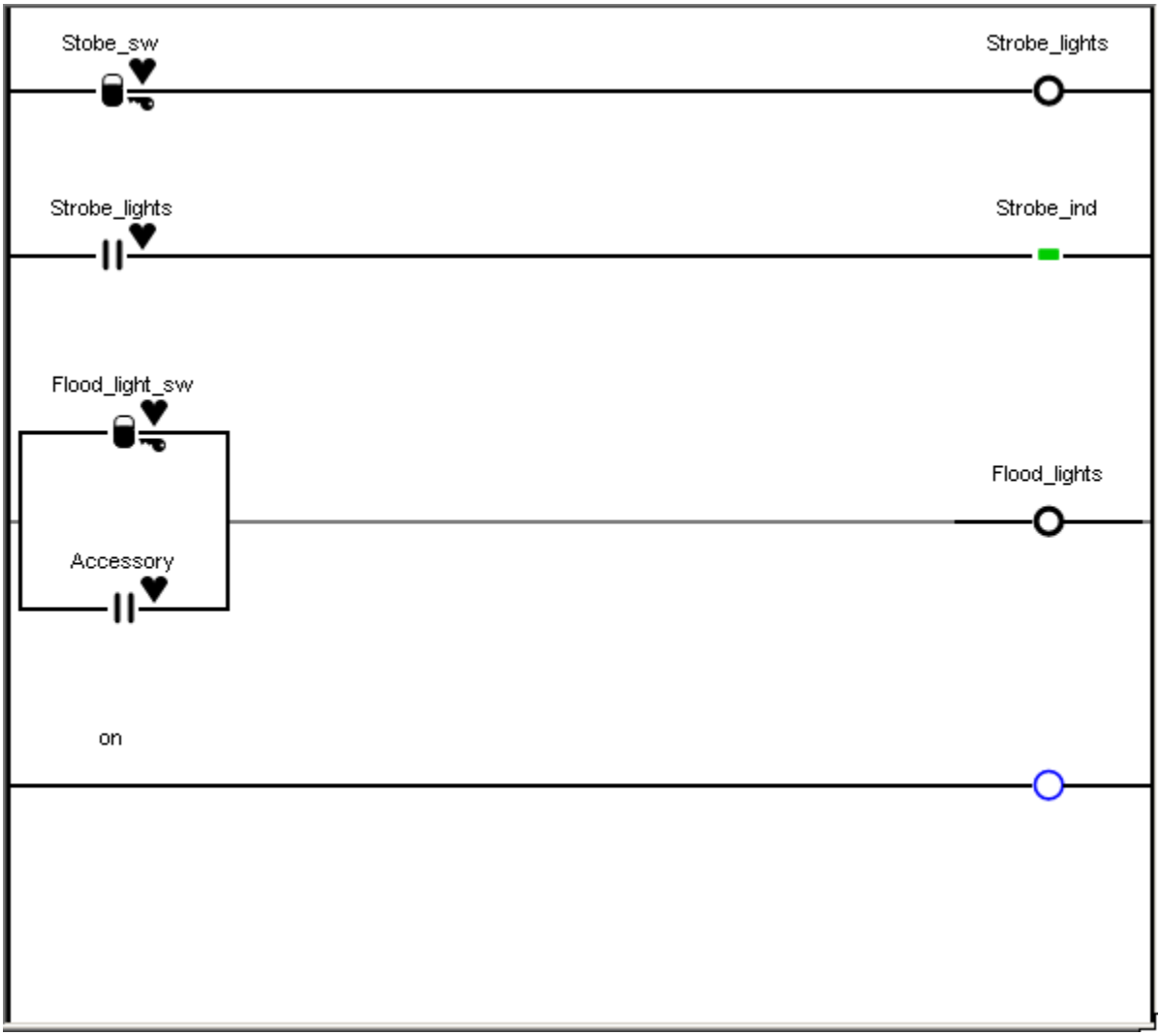
The Logic Block heading is the title of the Logic Block. Logic Blocks make up the advanced logic on a vehicle. It is a way of organizing advanced programming, i.e. vehicle lighting in one block, PTO functions in another, emergency lighting in another. In the Dropdown menu there are six Advanced Logic Tab headings, and two functions. They are listed and defined as follows:

Name	Description
Logic Block	Logic Block file name.
Proprietary	Sets up a check box that allows the user to choose proprietary format. Caution: If the user makes a Logic Block proprietary, then diagnostics are restricted to the individual that created it. Therefore, a vehicle with Advanced Logic that is set to proprietary will not be easily diagnosed or serviceable by International dealers. See the Diamond Logic® Builder Software Users Manual – Volume II Advanced Programming for more information on proprietary logic.
Description	Logic Block description.
Date Edited	Date created or edited.
User	User ID that created the Logic Block.
Active	When checked, the Logic Block is included in the vehicle configuration.
Find Matches…	Finds selected words in titles of Logic Blocks. This is the same as left-clicking the Filter icon.
Clear Matches	Clear Matches.

Display Area

Once an item in the logic block list is selected, the left hand display area will populate with a ladder diagram of the programmed functions. The ladder diagrams are created and may be edited in this screen.

The display area itself is resizable. Using the cursor, the width of the display area can be increased or decreased. Doing so will also change the width of the Module Tab's area, thus decreasing or increasing the Module Tab list area.

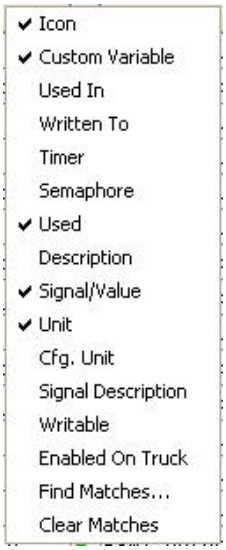


My Variables

This area of the Advanced Logic screen allows the user to view variables used in the advanced logic programmed, if there is any, on this vehicle.

Variable Selection Column Headings

The column headings displayed below the “My Variables” tab are selectable and have adjustable width. The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings. They are listed and defined as follows:



Name	Description
Icon	Displays the variable name icon that appears in the ladder logic.
Custom Variable	Custom name the user has given to the custom variable. (NOTE no spaces or symbols such as + - & * #, etc may be used.
Used In	The logic block that custom variable is used in.
Written To	Whether it is possible to write to that variable or not.
Timer	Whether the variable is a timer or not.
Semaphore	The variable can be written to however other internal variables may take precedence over your set variable.
Used	True when the variable is used in a logic block or the mapped signal is used on the vehicle.
Description	Custom description the user has given to the custom variable.
Signal/Value	The system name for the selected signal.
Unit	Unit of measure the variable displayed as, i.e. seconds, on/off, etc.
CFG Unit	The system unit of measure for the selected variable.
Signal Description	Description for that variable. If no text in this field, the parameter is an internal value.
Writable	Whether the user can write to this value or monitor or use it to drive other features.
Enabled On Truck	Checked if the variable is enabled and used on the truck.
Find Matches…	Sort Matching Rows To Top. Find Matching Words in the Selected Screen. This is the same as left-clicking the Filter icon.
Clear Matches	Clear Matches.

Variable List

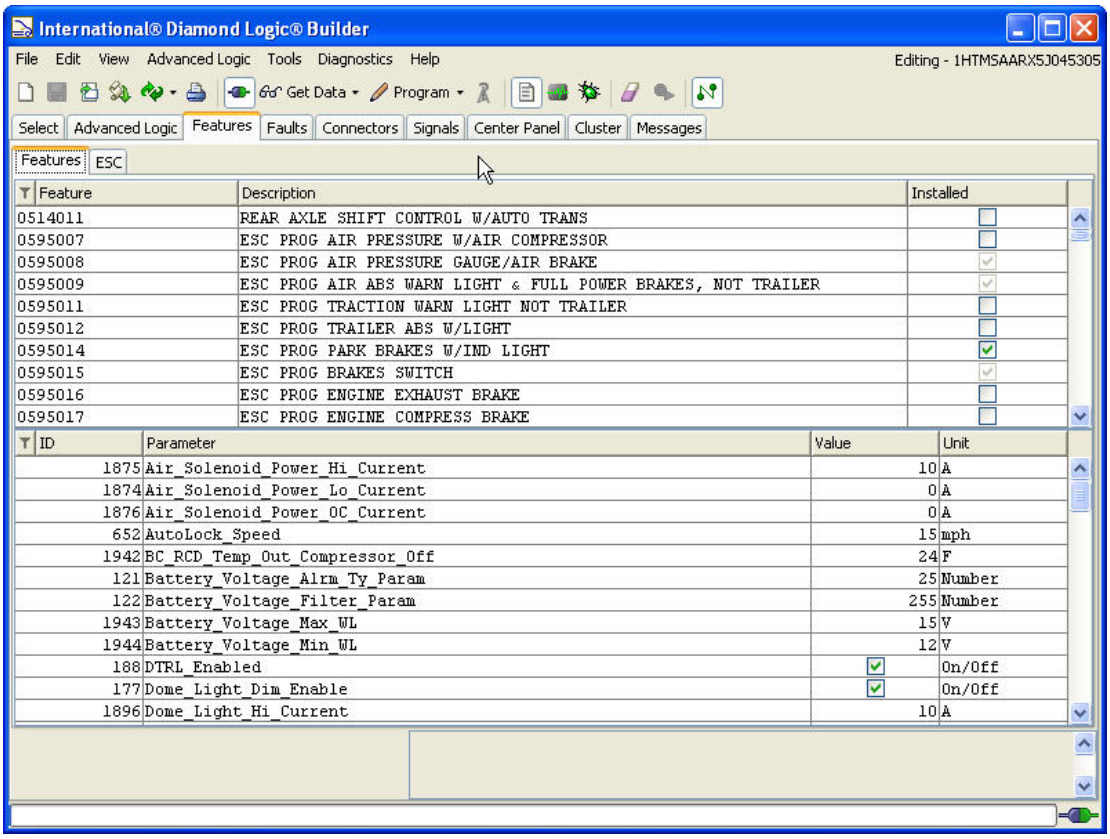
Logic Blocks are built using the inputs and outputs of the associated modules in the Advanced Logic Tab. Clicking and dragging the inputs and outputs to the left hand side of the screen allows the user to build what is known as “ladder logic”.

Red_Light	RPM4_Output1	On/Off
Yellow_Light	RPM4_Output2	On/Off
Green_Light	RPM4_Output3	On/Off
Dont_Walk	RPM4_Output4	On/Off
Walk	RPM4_Output5	On/Off
state		Number
blink		On/Off
change_timer		s
win		Number
t		s
wait		Number
base		Number
speed		Number
random		Number
which		Number
Rudolph	RPM7_Output1	On/Off
Dasher	RPM7_Output2	On/Off
Dancer	RPM7_Output3	On/Off
Prancer	RPM7_Output4	On/Off
Vixen	RPM7_Output5	On/Off
Comet	RPM7_Output6	On/Off
going_up		On/Off
scan_time		s
scan		Number
kick		On/Off
scan1	RPM1_Output2	On/Off
scan5	RPM1_Output6	On/Off
scan2	RPM1_Output3	On/Off
scan3	RPM1_Output4	On/Off
scan4	RPM1_Output5	On/Off
scan0	RPM1_Output1	On/Off

Features Tab

The Feature Tab displays features and/or parameters for the selected vehicle.

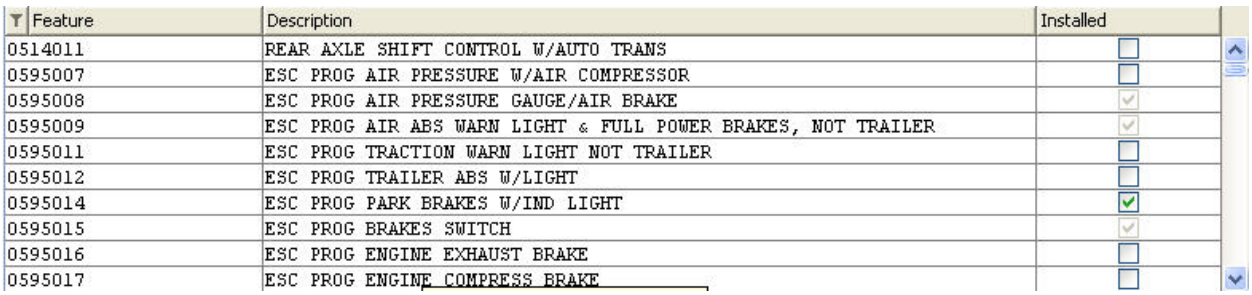
Features Tab view with Features Sub-Tab selected



When the Features Tab is selected, two or three sub-tabs will appear below it. The Features and ESC Sub-Tabs will always be available. The Custom Logic Sub-Tab will only appear if parameters have been assigned by advanced logic.

The Features Sub-Tab screen is divided into two sections: Feature Listing and the Parameter (Lower) Window. The top portion of the screen displays the features available in a list form.

Feature Sub-Tab Listing



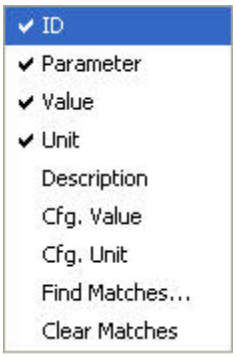
Features Sub-Tab Column Headings

The Features Tab screen contains seven column headings, which are adjustable in width. The columns are selected from a Dropdown menu. Placing the mouse over the feature bar and right clicking will display this Dropdown menu (in addition, right-clicking the Find Icon will do the same thing). The menu is listed and defined as follows.

Name	Description
Feature	Features available for the selected vehicle are listed here in a numeric order.
Description	A brief description of each feature.
Installed	Signifies the feature is installed in the selected vehicle.
Find Matches…	Use to find matches anywhere on the table and bring them to the top of the screen.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

Features Tab Programmed parameter (Lower) Window Columns

This window lists the programmed parameters for the selected vehicles features. The columns are selected from a Dropdown menu. Placing the mouse over the feature bar and right clicking will display this Dropdown menu (in addition, right-clicking the Find Icon will do the same thing). The Features Tab Programmed Parameter window columns are listed and defined as follows.



Name	Description
ID	Numerical label to identify the programmed parameter. Useful when speaking with Tech Central.
Parameter	Signal name for the programmed parameter
Value	Numeric value for the programmed parameter. A check box is used if the programmed parameter is merely an ON / OFF type. A check means the programmed parameter is ON.
Unit	This is the unit of measure for the programmed parameter.
Description	A brief description of each programmed parameter is displayed in this column.
CFG Value	Raw data value used by the ESC software. This column would normally be turned off as it is of no value to the average user.
CFG Unit	This is the unit of measure for the raw data value used by the ESC software. This column would normally be turned off since it is of no value to the average user.
Set With Template	When checked, the programmed parameter value will be set on the vehicle when the template is applied.
Find Matches	Use to find matches anywhere on the table and bring them to the top of the screen.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

As with other headings, when left clicked, the columns sort their lists in ascending or descending order per the heading's parameter. The following screens illustrate the sort function described. Depending on the column selected, information is sorted by the column's parameters. All of the screens apply to the vehicle chosen from the Select screen. These are from the Features screen, programmed parameters window.

Parameter	Value
Wipers_Lo_Current	0
Wipers_Hi_Current	15
Vehicle_Speed_Min_WL	0
Vehicle_Speed_Max_WL	84.999
Vehicle_Speed_Filter_Param	255
Vehicle_Speed_Alrm_Ty_Param	0
Stop Override Hazard Enabled	☑

Parameter

Parameter	Value
AutoLock_Speed	15
BC_RCD_Temp_Out_Compressor_Off	24
Battery_Voltage_Alrm_Ty_Param	25
Battery_Voltage_Filter_Param	255
Battery_Voltage_Max_WL	15
Battery_Voltage_Min_WL	12
DTRL_Enabled	☑
Dome_Light_Dim_Enable	☑

Notice the Value and Unit columns. The values change in accordance with the selected column and its' sorting parameters.

Features Tab Programmed Parameter (Lower) Window Values

When a programmed parameter is selected, a lower set of windows appears. Programmed parameters quantities are displayed in these windows.

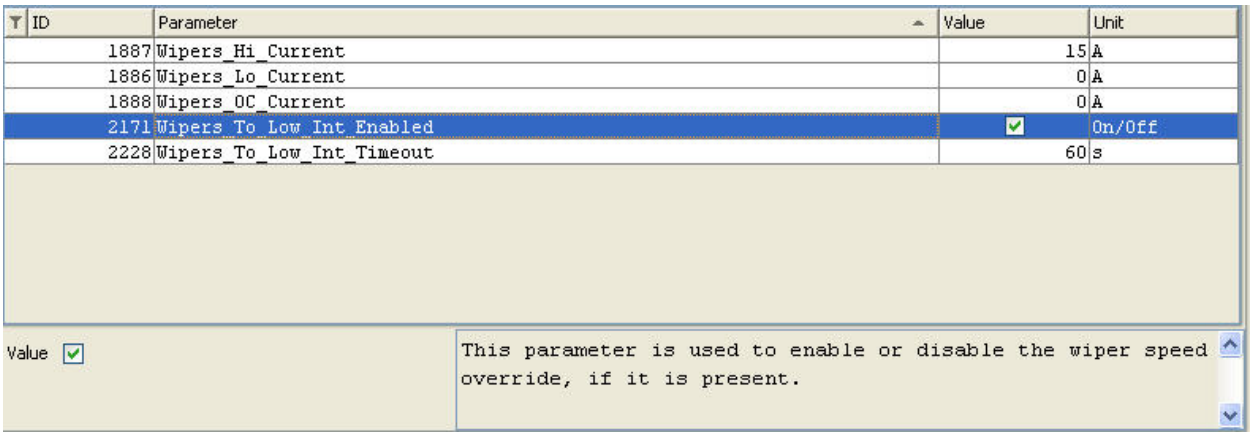
NOTE: depending on which programmed parameter is selected; the lower window display may change to reflect customizable values. An on-screen dialog box appears to define the selected programmed parameter. The value window's label to the right changes automatically, to define the unit (minutes, seconds, amps, etc.).

ID	Parameter	Value	Unit
1887	Wipers_Hi_Current	15	A
1886	Wipers_Lo_Current	0	A
1888	Wipers_OC_Current	0	A
2171	Wipers_To_Low_Int_Enabled	☑	On/Off
2228	Wipers_To_Low_Int_Timeout	60	s

Value 0 0 to 20 by 0.1 A

Windshield Wipers Low Current Detection Level (Amps)

The check box in the Value column or in the display area identifies if the value has been set to on or off.



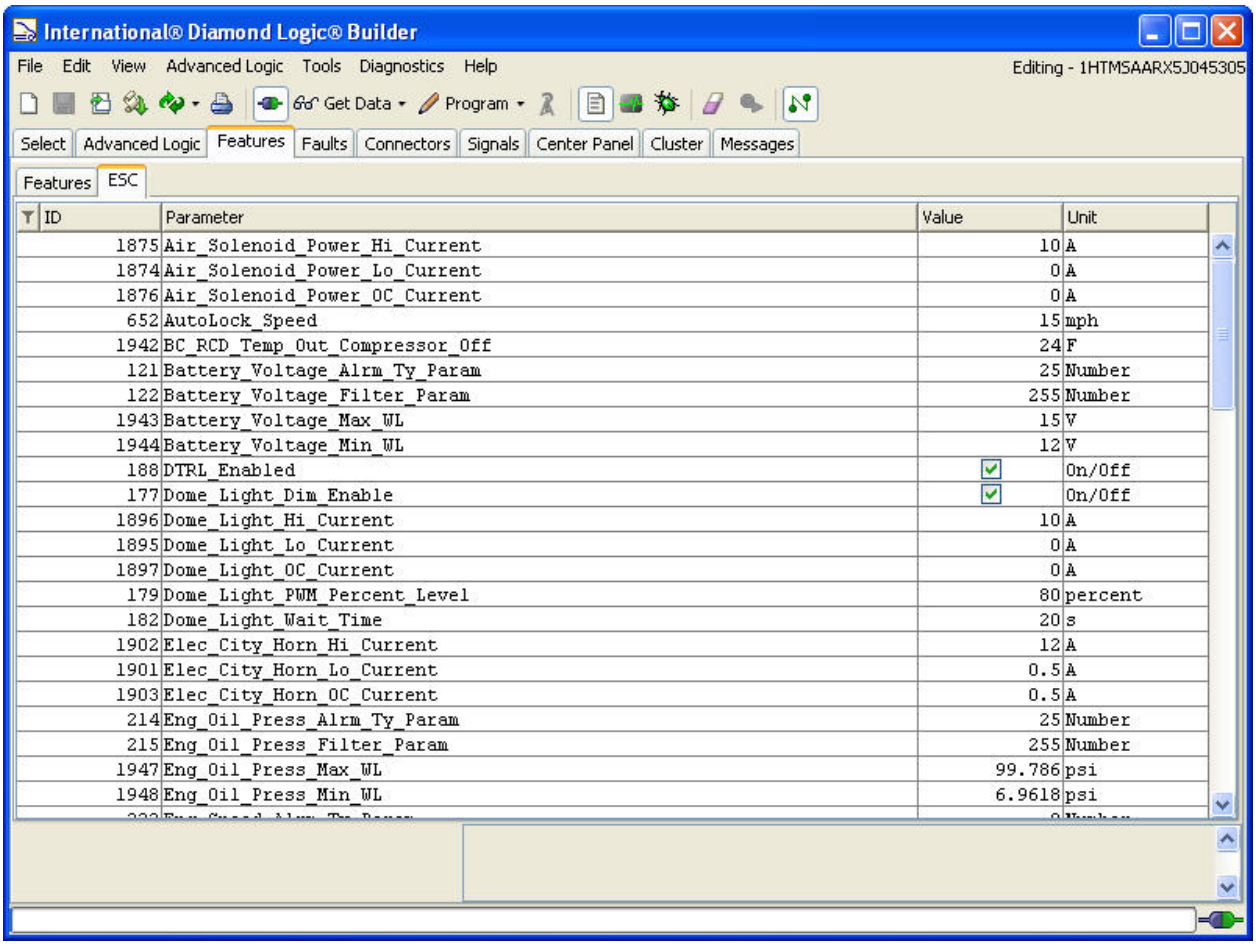
ID	Parameter	Value	Unit
1887	Wipers_Hi_Current	15	A
1886	Wipers_Lo_Current	0	A
1888	Wipers_OC_Current	0	A
2171	Wipers_To_Low_Int_Enabled	☑	On/Off
2228	Wipers_To_Low_Int_Timeout	60	s

Value ☑

This parameter is used to enable or disable the wiper speed override, if it is present.

ESC Sub-Tab Display

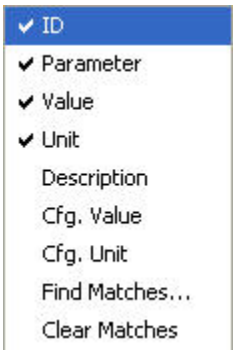
When the ESC Sub-Tab is selected, a list of the parameters installed on the selected vehicle populates the Features tab screen.



ID	Parameter	Value	Unit
1875	Air_Solenoid_Power_Hi_Current	10	A
1874	Air_Solenoid_Power_Lo_Current	0	A
1876	Air_Solenoid_Power_OC_Current	0	A
652	AutoLock_Speed	15	mph
1942	BC_RCD_Temp_Out_Compressor_Off	24	F
121	Battery_Voltage_Alrm_Ty_Param	25	Number
122	Battery_Voltage_Filter_Param	255	Number
1943	Battery_Voltage_Max_WL	15	V
1944	Battery_Voltage_Min_WL	12	V
188	DTRL_Enabled	☑	On/Off
177	Dome_Light_Dim_Enable	☑	On/Off
1896	Dome_Light_Hi_Current	10	A
1895	Dome_Light_Lo_Current	0	A
1897	Dome_Light_OC_Current	0	A
179	Dome_Light_PWM_Percent_Level	80	percent
182	Dome_Light_Wait_Time	20	s
1902	Elec_City_Horn_Hi_Current	12	A
1901	Elec_City_Horn_Lo_Current	0.5	A
1903	Elec_City_Horn_OC_Current	0.5	A
214	Eng_Oil_Press_Alrm_Ty_Param	25	Number
215	Eng_Oil_Press_Filter_Param	255	Number
1947	Eng_Oil_Press_Max_WL	99.786	psi
1948	Eng_Oil_Press_Min_WL	6.9618	psi

ESC Sub-Tab Programmed Parameter Window Columns

This window lists the programmed parameters for the selected vehicles features. The columns are selected from a Dropdown menu. Placing the mouse over the feature bar and right clicking will display this Dropdown menu (in addition, right-clicking the Find Icon will do the same thing). The Features Tab Programmed Parameter window columns are listed and defined as follows.



Name	Description
ID	Numerical label to identify the programmed parameter. Useful when speaking with Tech Central.
Parameter	Signal name for the programmed parameter
Value	Numeric value for the programmed parameter. A check box is used if the programmed parameter is merely an ON / OFF type. A check means the programmed parameter is ON.
Unit	This is the unit of measure for the programmed.
Description	A brief description of each programmed parameter is displayed in this column.
CFG Value	Raw data value used by the ESC software. This column would normally be turned off as it is of no value to the average user.
CFG Unit	This is the unit of measure for the raw data value used by the ESC software. This column would normally be turned off since it is of no value to the average user.
Find Matches	Use to find matches anywhere on the table and bring them to the top of the screen.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

As with other headings, when left clicked, the columns sort their lists in ascending or descending order per the heading's parameter. Depending on the column selected, information is sorted by that column's parameters. All of the screens apply to the vehicle selected on from the Select tab.

Faults Tab Main Screen

The Faults Tab allows the user to view diagnostic trouble codes generated from the Electrical System Controller. The user must be in Diagnose mode. It will not display any vehicle troubles codes from the Engine, ABS or Transmission.

Once connected to a vehicle, the Faults Tab will display any available faults.

Select | Advanced Logic | Features | **Faults** | Connectors | Signals | Center Panel | Cluster | Messages

SPN	...	B...	B...	.	...	Message	Probable Cause	Module
639	14	228	254	✔	1	Failed to receive PGN 65252.		Body Cont...
612	14	25	2	✔	1	Analog channel 25 is out of range high.	Shorted h...	Body Cont...
625	14	130	0	✔	1	Driver Door Module (two-door or four-door) (address 130)...		Driver Do...
625	14	64	0	✔	1	Front Passenger Door Module (address 64) not communicati...		Front Pas...
613	14	1	5	✔	1	HVAC Control Head diagnostic circuit loss of communicati...		Body Cont...
639	14	255	254	✔	1	Failed to receive PGN 65279.		Body Cont...
639	14	192	254	✔	1	Failed to receive PGN 65216.		Body Cont...
612	14	2	2	✔	1	Analog channel 2 is out of range high.	Shorted h...	Body Cont...
612	14	30	2	✔	1	Analog channel 30 is out of range high.	Shorted h...	Body Cont...

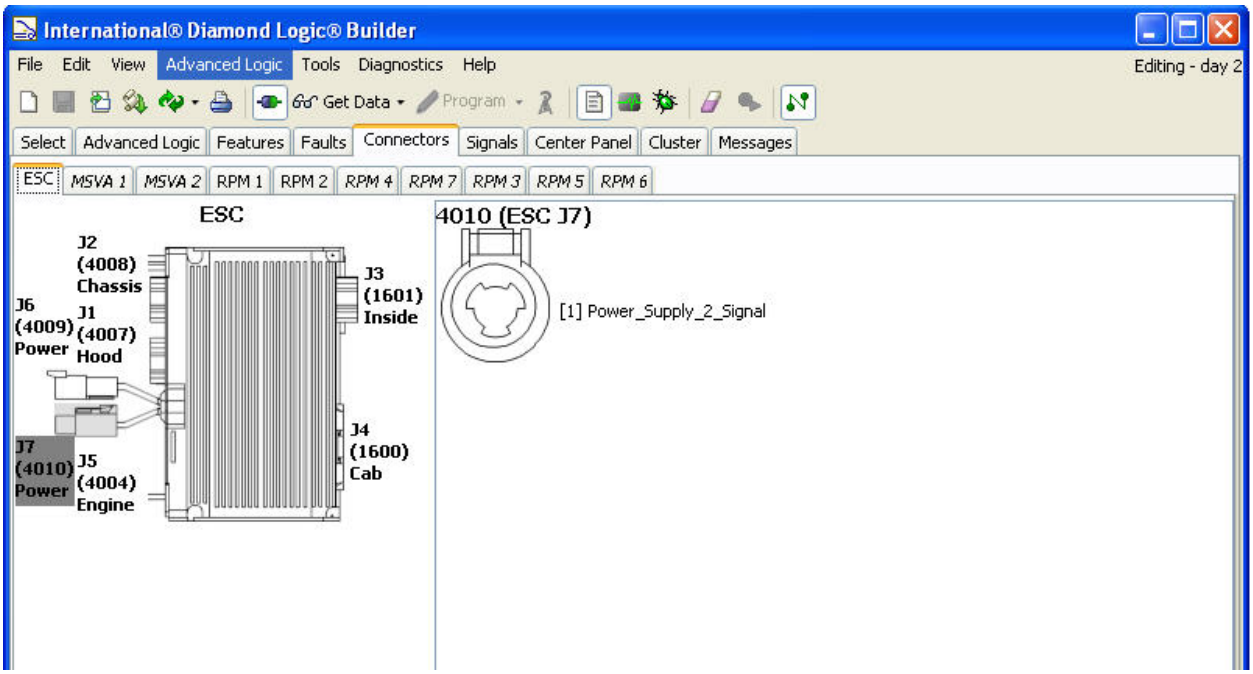
The column headings for the Faults Tab are listed and defined as follows.

Name	Description
SPN	Suspect Parameter Number: Number that indicates the Major System that is experiencing a failure mode.
FMI	FMI is a number for “Fault Mode Indicator.” Currently this value is always 14 for “Indeterminate” as per the SAE J1939 specification. The FMI for the Diamond Logic® electrical system is currently displayed under the Byte 8 column listed below.
Byte 7	Number that indicates the sub-system that is experiencing a failure mode.
Byte 8	Number to describe the detailed fault mode such as open circuit, shorted to ground, etc.
Active	Indicator to show whether a fault is currently active or inactive.
OC	Occurrence Count: Number of times a fault has gone active and then inactive.
Message	Text description of the numerical fault code.
Comment	Explanation of Message Description.
Probable Cause	Probable cause of the fault.
Pins	Module pin and connector associated with the fault code, if applicable.
Module	Text name of module associated with the fault code, if applicable.
Address	Address of the module logging the fault. Currently, this number is always 33 for the ESC. Recommend turning this column off, leaving more space for other columns, until later enhancements provide more varied data.
Find Matches…	Use to find matches anywhere on the table and bring them to the top of the screen.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

Note: the SPN, FMI, Byte 7 and Byte 8 columns together make up the diagnostic trouble code. All four of these columns should remain selected.

Connectors Tab

The Connectors Tab allows the user to view modules programmed for the selected vehicle. The screen displays more tabs to select a particular module. An inactive, not configured, module is signified by its Italicized title.

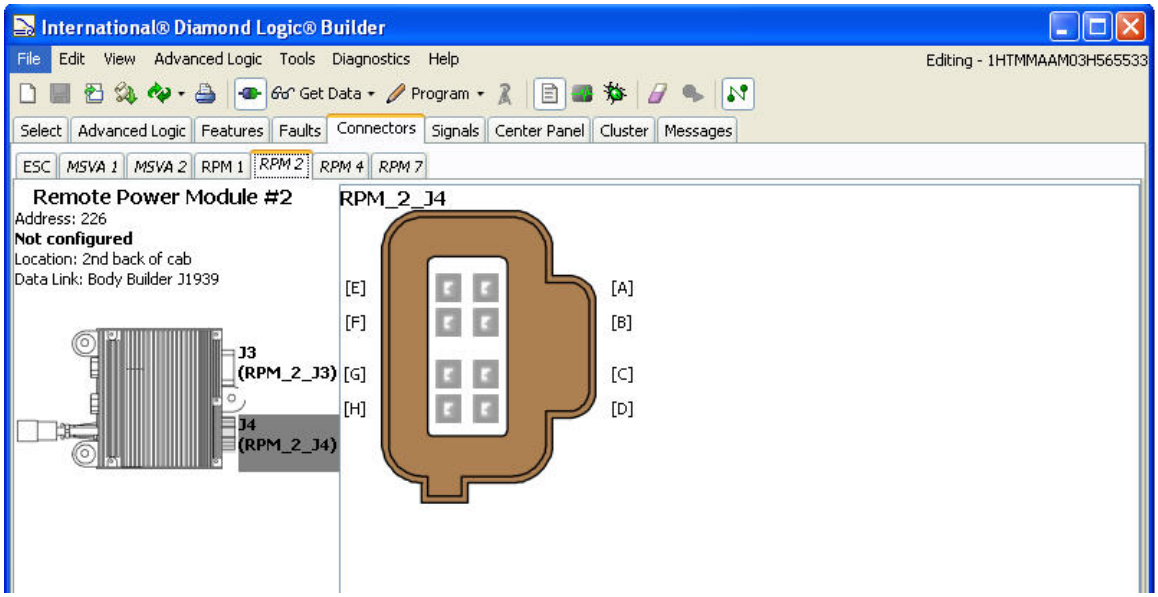


Connectors Tab Modules

Name	Description
ESC	Electronic System Controller.
MSVA 1	Modular Solenoid Valve Assembly 1.
MSVA 2	Modular Solenoid Valve Assembly 2.
RPM 1	Remote Power Module 1.
RPM 2	Remote Power Module 2.
RPM 4	Remote Power Module 4.
RPM 7	Remote Power Module 7.
RPM 3	Remote Power Module 3.
RPM 5	Remote Power Module 5.
RPM 6	Remote Power Module 6.

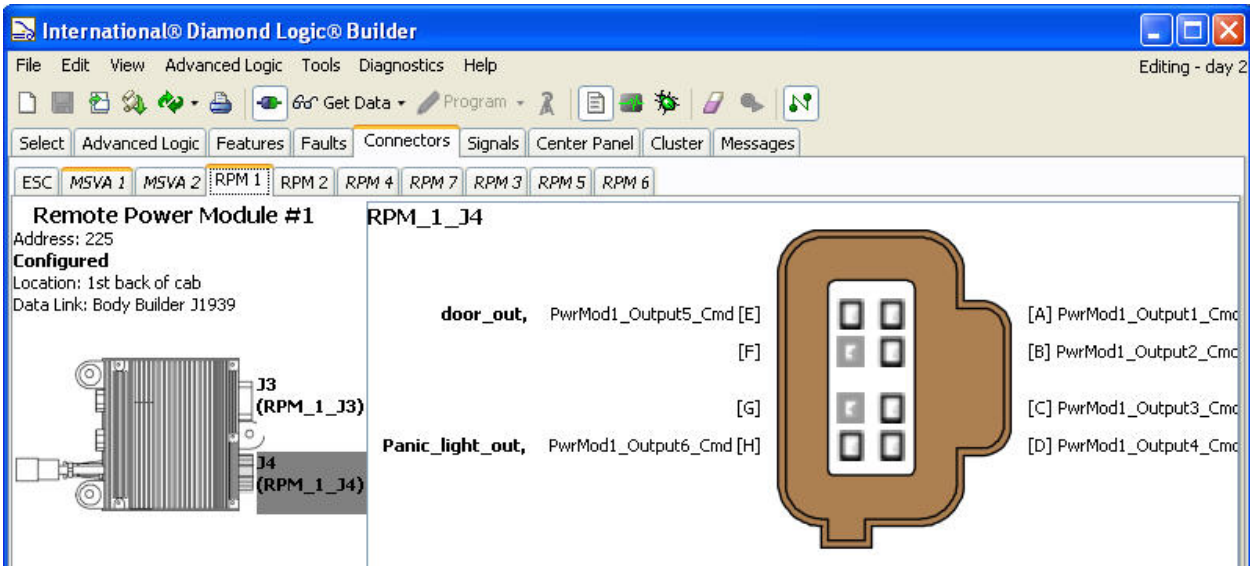
Not Configured Module

RPM 2 module's title is *italicized* indicating it is not configured. When selected, as illustrated, the screen displays the RPM module and connectors. The connector has no labels.



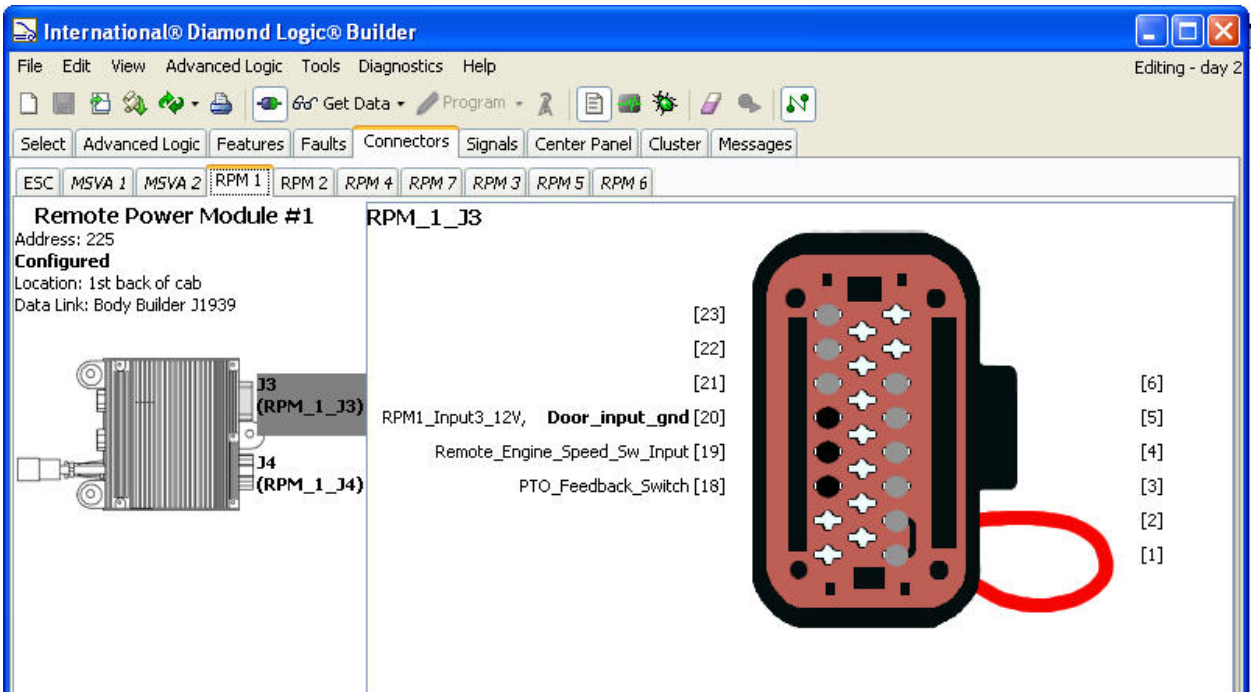
Configured Module

RPM 1 module's title is not italicized indicating it is configured. When selected, the screen displays the RPM module and connectors. The connector pin outs are labeled with all signals associated with that pin. The outside signal names are internal signals used by the system processor. Others signal names are provided for usage by the Advanced Logic user. General-purpose names are applied to signals that have not been used by Advanced Logic. Those signals that are in **bold** have been used in Advanced Logic features.



Selecting a Connector

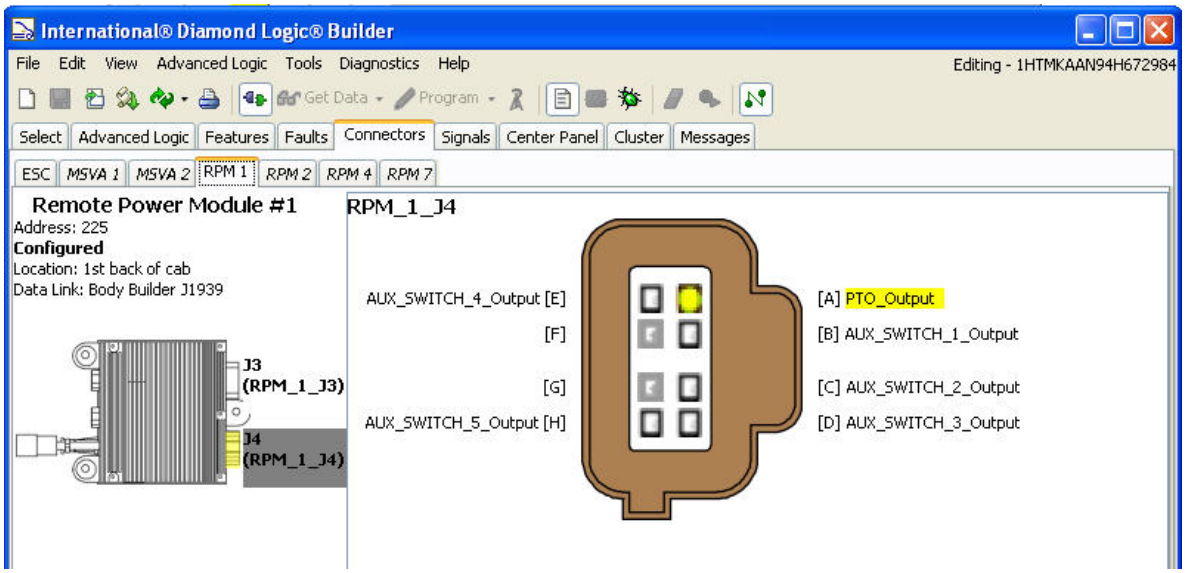
When a module connector is selected, the connector in the module view changes to a dark gray color. The newly selected connector and pin out information appear in the right hand window.



Horizontal scroll bars appear when needed for scrolling left and right to view all connector data.

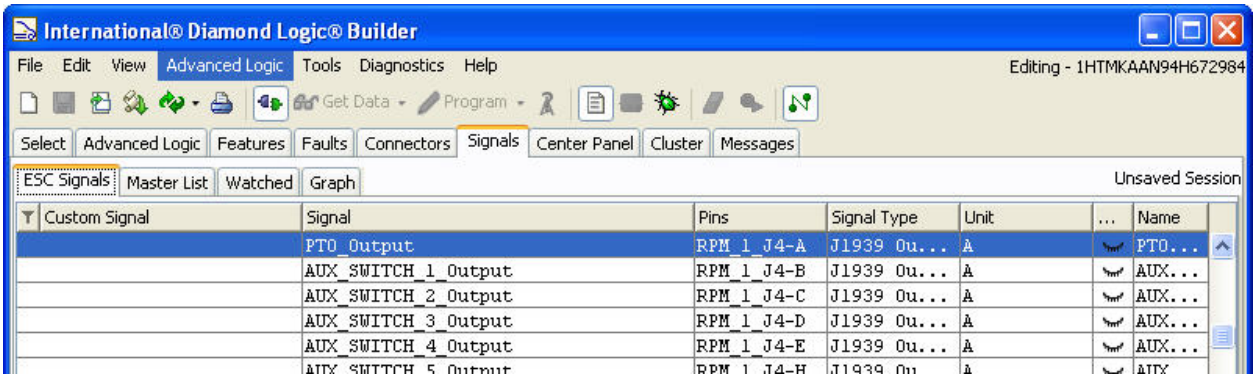
Selecting a Connector Pin

The user can lock on an output connector pin command in the connector view for diagnosis purposes. When a connector pin label is selected the Module Tab, connector pin, pin label and pictured module connector are all highlighted in yellow. Clicking on any pin will turn it yellow. Selecting the Signals Tab will then display the highlighted signal for additional information. In the example below PTO_Out has been selected.



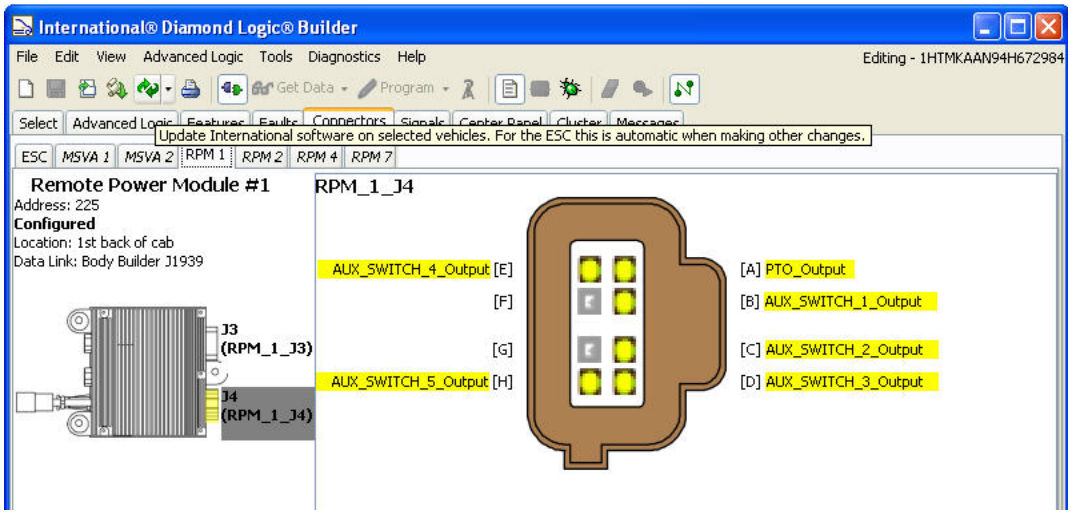
Signal Tab View of Selected Pin

Selecting the Signals Tab will then show the selected pin signal description and details.



Selecting multiple pin signals

Holding the “Control” key and clicking the desired pins can select more than one pin.

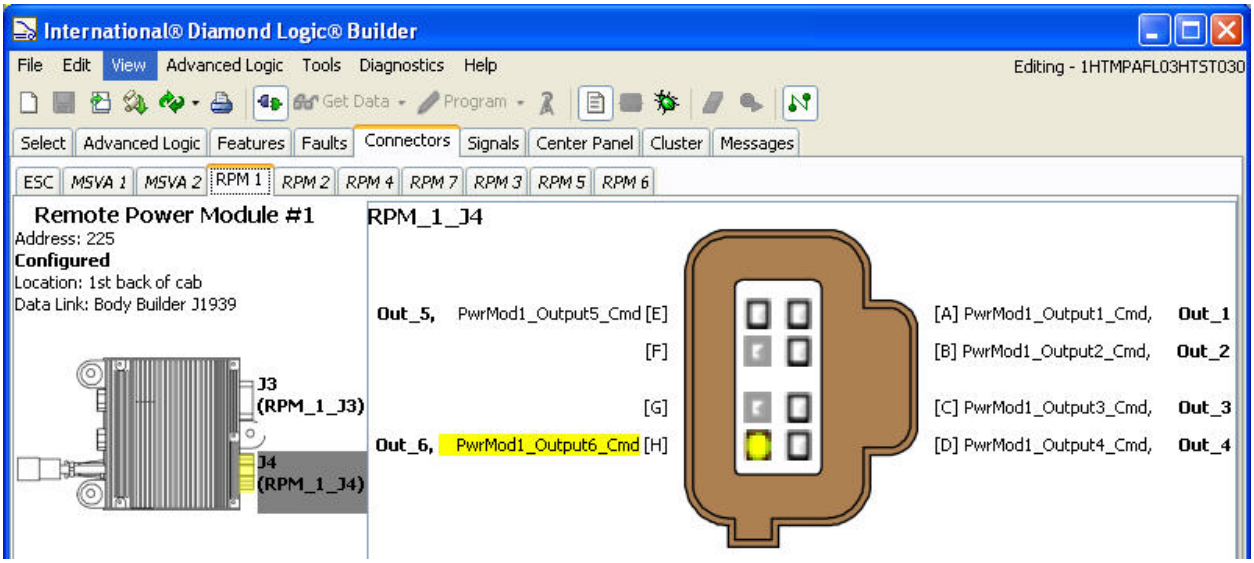


Deselecting a Pin

To deselect a pin, simply hold the Control key and click on the pin to deselect.

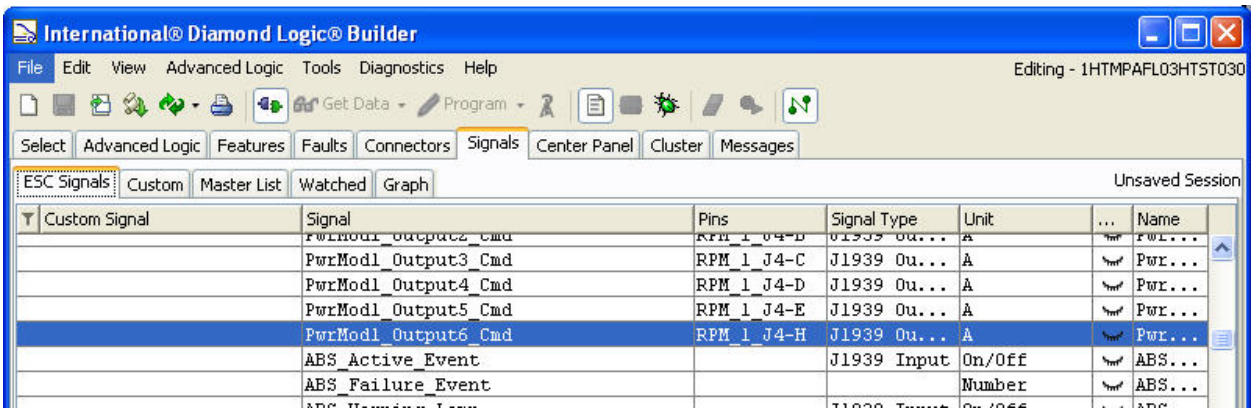
Selecting a Pin Used in Advanced Logic

The pin can be selected by single clicking the pin itself, the pin command text or the pin request text. The text, pin and the Module Tab will then all highlight yellow.

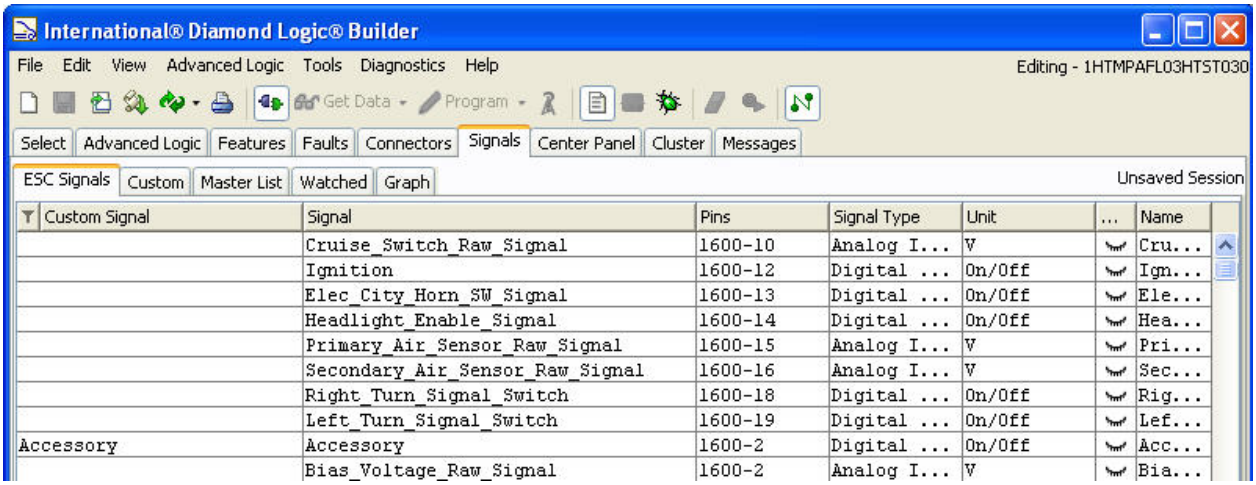


Selecting the Signals Tab will then show the selected pin signal description and details. (Note that the signal highlighted will depend on where the user clicks. For example, clicking the pin itself or the pin name text will highlight the output request signal. Clicking the command text will highlight the output command signal. See screens below.)

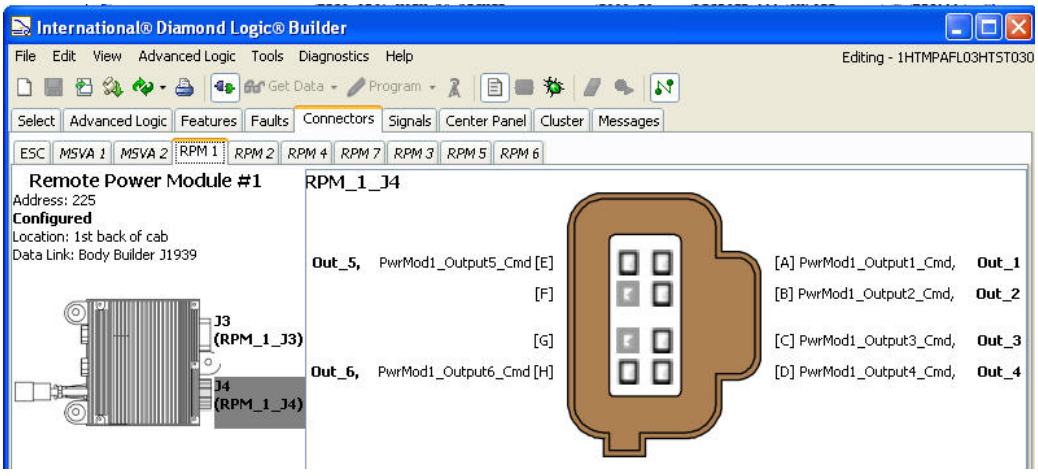
Signal view when the output pin or pin name is clicked



Signal view when the output pin command is clicked



To unselect an output pin, simply hold the Control key and click on the pin. Alternatively, the user can click on another VIN or template.



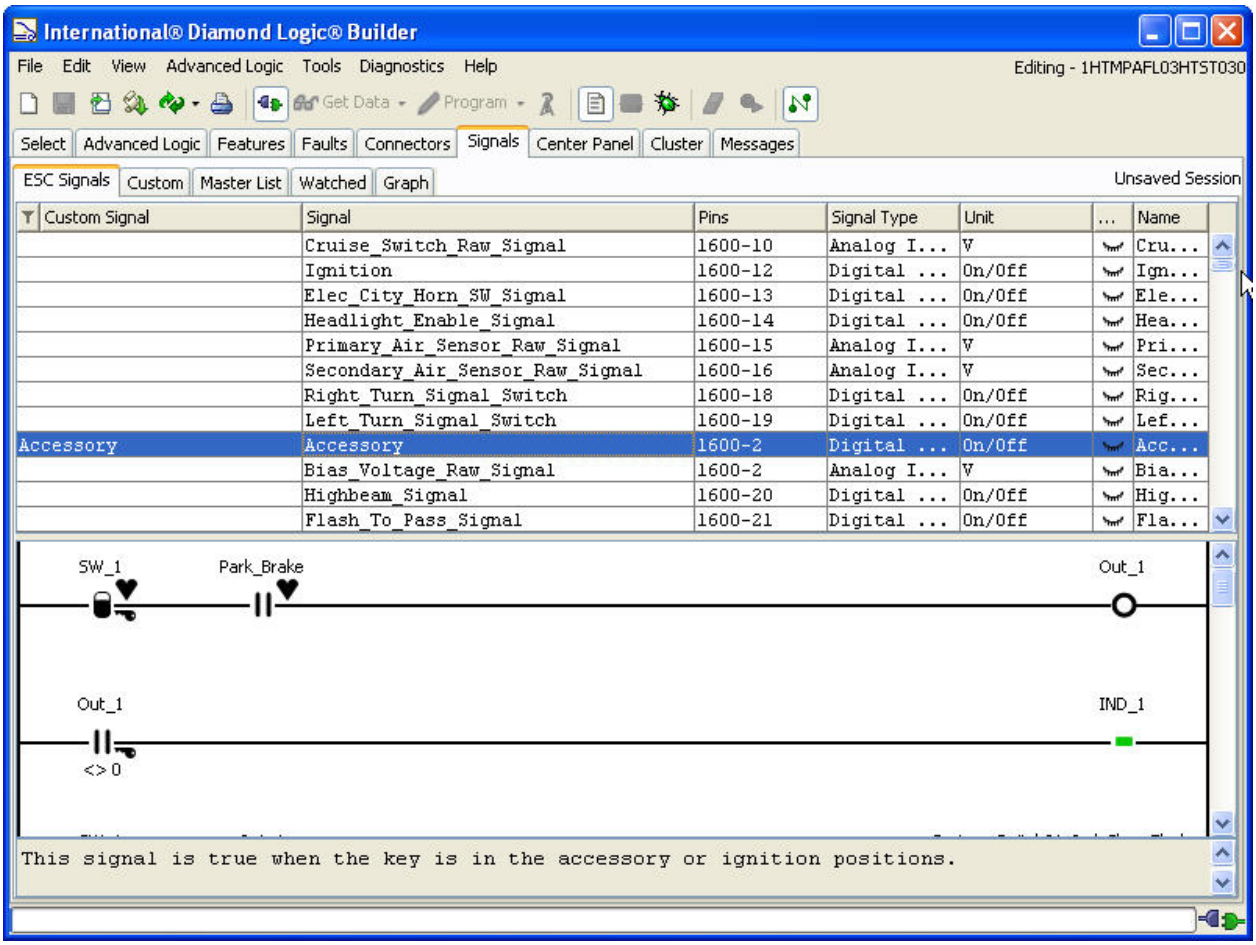
These functions apply to the ESC and Air Solenoid Module views as well.

Signals Tab

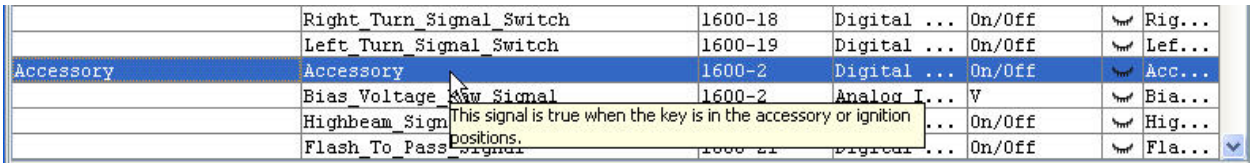
The Signals Tab allows the user to view detailed information about each electrical signal that is available for use by International engineered features and by Advanced Logic, if applicable.

There are 5 sub-tabs; ESC Signals, Custom, Master List, Watched, and Graph displayed below the Signals Tab when it is selected.

The upper section of the Signals Screen displays all signals associated with the selected vehicle. The lower section displays, if applicable, associated ladder logic as it pertains to the selected signal from the upper screen.



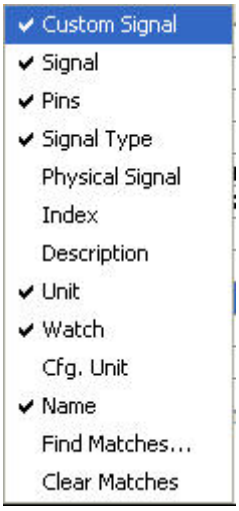
Notice in the screen below a help message is displayed. Throughout the program, placing the cursor over an item can display help as shown below.



Signals Tab Column Headings

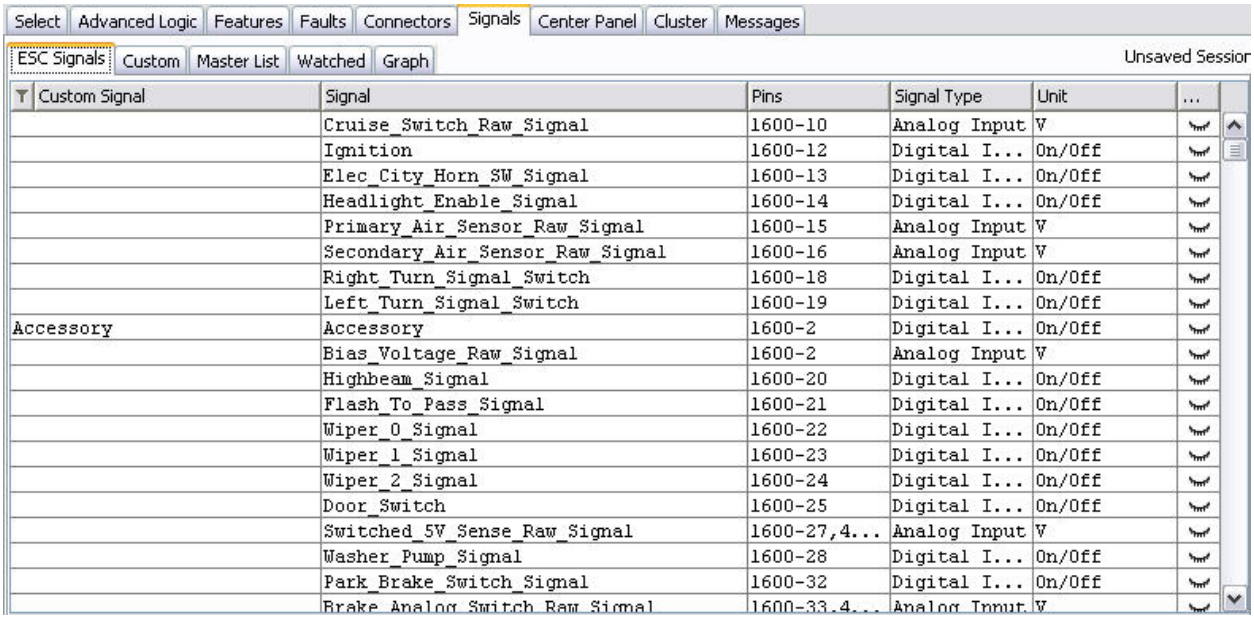
All sub-tabs below the Signal Tab, except the Graph Tab, have the following column headings available for selection.

The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings. They are listed and defined as follows:



Name	Description
Custom Signal	Displays the custom signal name assigned by the Diamond Logic® Builder software user.
Signal	Displays internal system name for each signal.
Pins	Displays connector and pin location in words.
Signal Type	Displays, if applicable, generated signal type, analog, digital, J1939, 1708 etc.
Circuit Segment	Circuit number.
Physical Signal	Name of the signal used by the system controller. This column would normally not be displayed since it is of no use to the Diamond Logic® Builder software user.
Index	Entry in the electrical system data table. This column would normally not be displayed since it is of no use to the Diamond Logic® Builder program user.
Description	Displays the logic description.
Unit	Unit that the variable is displayed as, i.e. Seconds, on/off, etc.
Watch	Displays the watched / not watched selection icon
Cfg. Unit	The unit of the raw data value used by the system. This column would normally not be displayed since it is of no use to the Diamond Logic® Builder program user.
Name	Displays the signal name
Find Matches…	Use to find matches anywhere on the table and bring them to the top of the screen.
Clear Matches	Clears the find matches function and puts the screen back to the currently sorted column format.

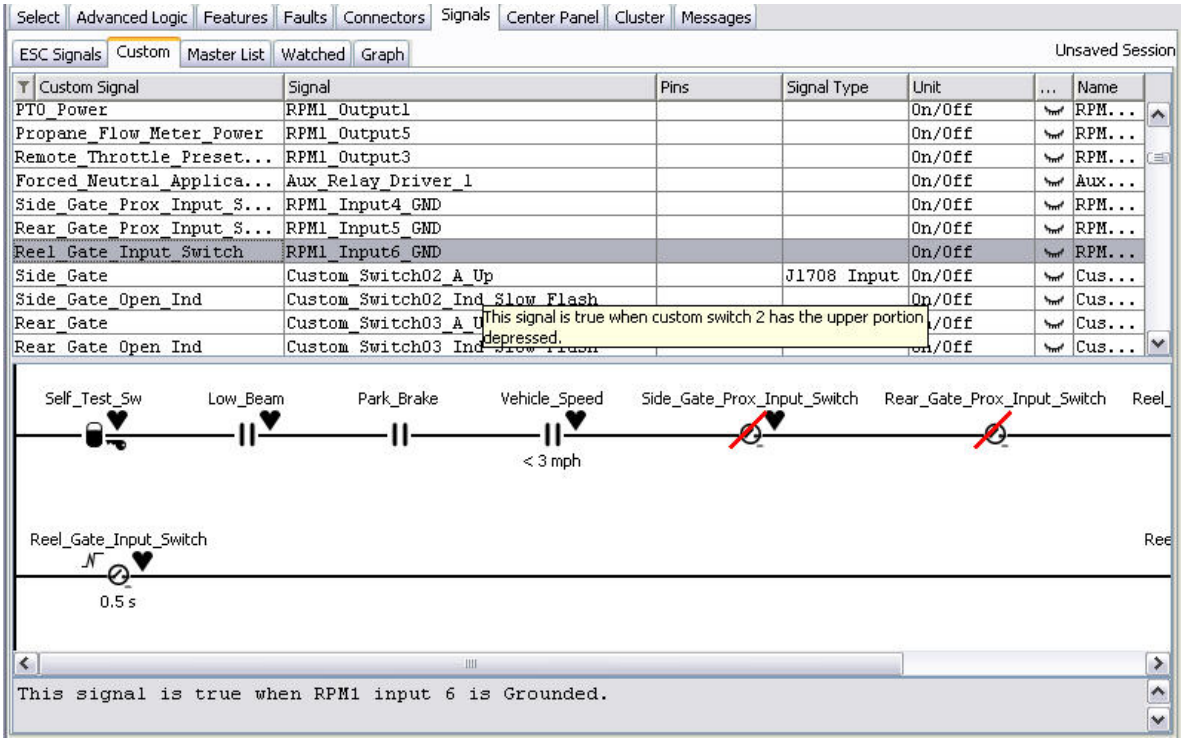
ESC Signals Sub-Tab: Watch Interlock Switch AUX 1 output signal.



Custom Signal	Signal	Pins	Signal Type	Unit	...
	Cruise_Switch_Raw_Signal	1600-10	Analog Input	V	
	Ignition	1600-12	Digital I...	On/Off	
	Elec_City_Horn_SW_Signal	1600-13	Digital I...	On/Off	
	Headlight_Enable_Signal	1600-14	Digital I...	On/Off	
	Primary_Air_Sensor_Raw_Signal	1600-15	Analog Input	V	
	Secondary_Air_Sensor_Raw_Signal	1600-16	Analog Input	V	
	Right_Turn_Signal_Switch	1600-18	Digital I...	On/Off	
	Left_Turn_Signal_Switch	1600-19	Digital I...	On/Off	
Accessory	Accessory	1600-2	Digital I...	On/Off	
	Bias_Voltage_Raw_Signal	1600-2	Analog Input	V	
	Highbeam_Signal	1600-20	Digital I...	On/Off	
	Flash_To_Pass_Signal	1600-21	Digital I...	On/Off	
	Wiper_0_Signal	1600-22	Digital I...	On/Off	
	Wiper_1_Signal	1600-23	Digital I...	On/Off	
	Wiper_2_Signal	1600-24	Digital I...	On/Off	
	Door_Switch	1600-25	Digital I...	On/Off	
	Switched_5V_Sense_Raw_Signal	1600-27,4...	Analog Input	V	
	Washer_Pump_Signal	1600-28	Digital I...	On/Off	
	Park_Brake_Switch_Signal	1600-32	Digital I...	On/Off	
	Brake_Analog_Switch_Raw_Signal	1600-33,4...	Analog Input	V	

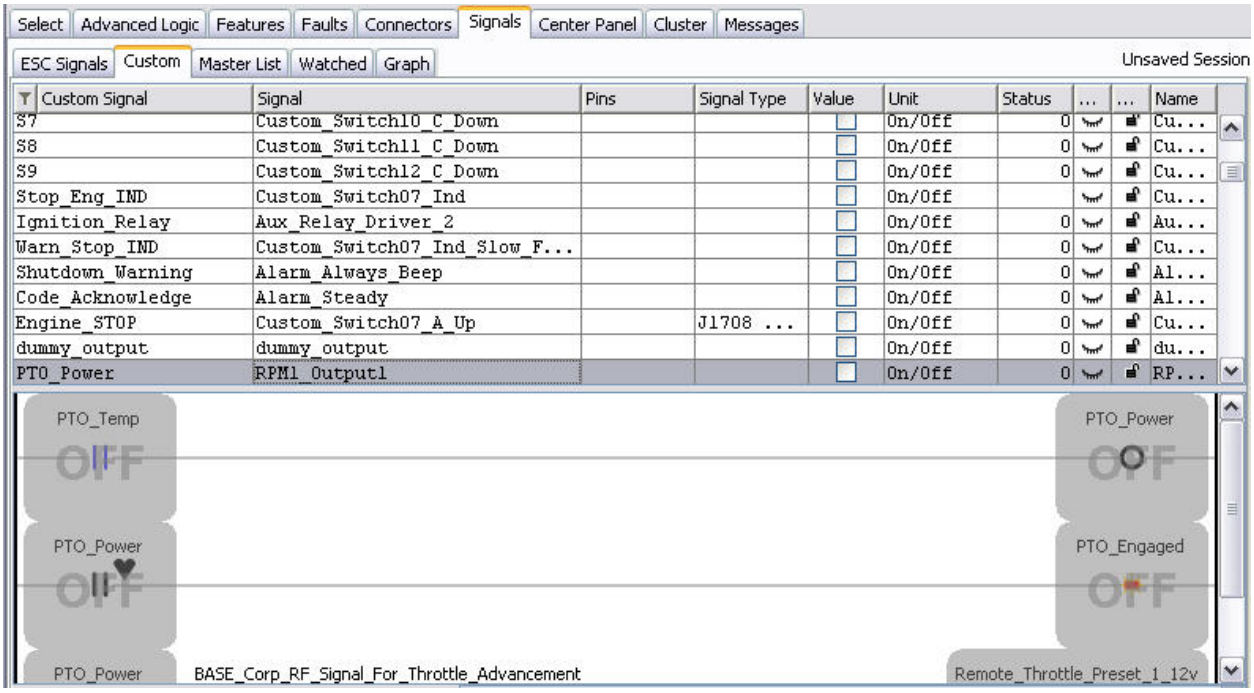
Custom Signals Sub-Tab: All Advanced logic signals used.

Note: When the Master Switch signal is highlighted, the lower portion of the screen populates with the corresponding logic for the selected signal.



Master List Sub-Tab

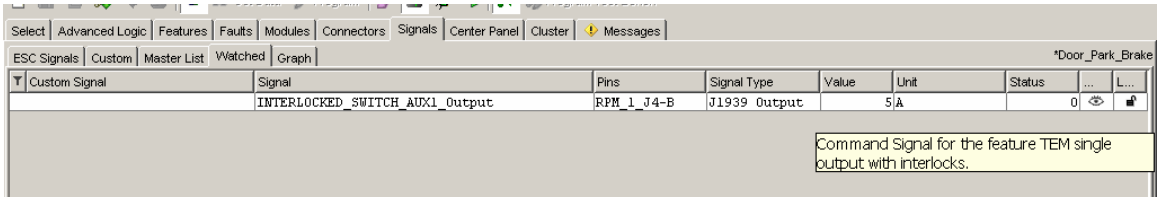
The Master List Tab displays all available signals on the International data link. This tab will also display the Advanced Logic corresponding to the selected signal as shown.



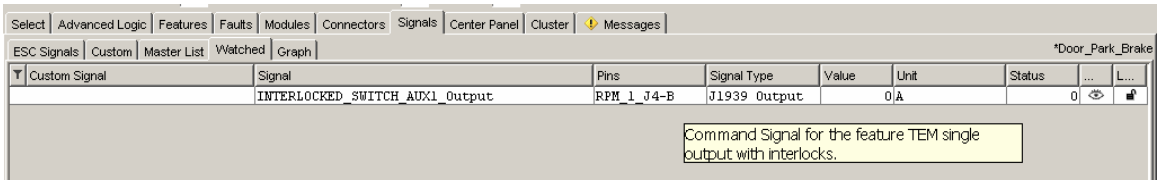
Watched Sub-Tab

The Watched Tab shows signals that have been selected to monitor from your master or customer signal list. This is done by highlighted the desired signal and clicking on the eye icon. In this case, the Interlocked Switch signal has been selected. Note that in screen 1 the signal output is indicating 5 amps. Screen two shows the same signal with the Interlocked Switch in the center panel off, notice that the signal output is now zero.

Screen 1:

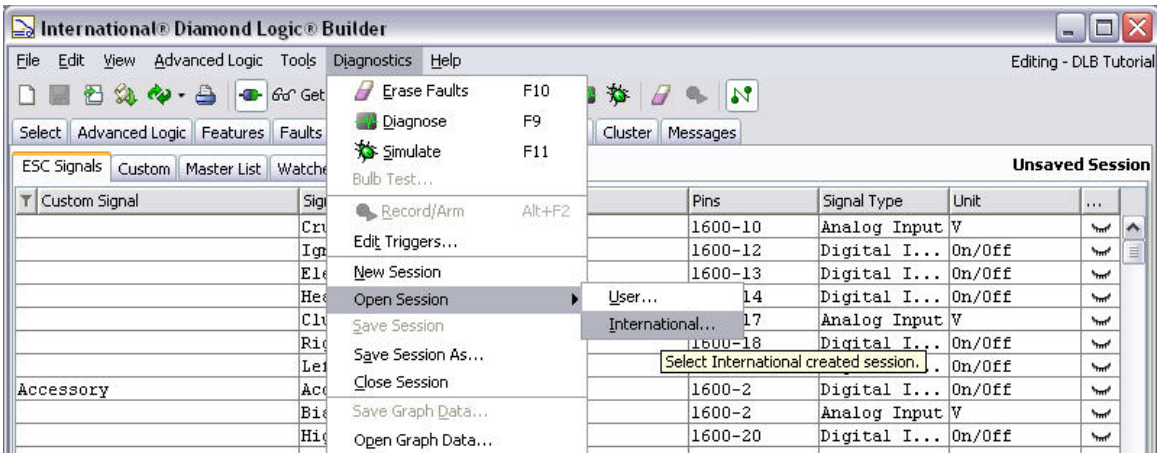


Screen 2:

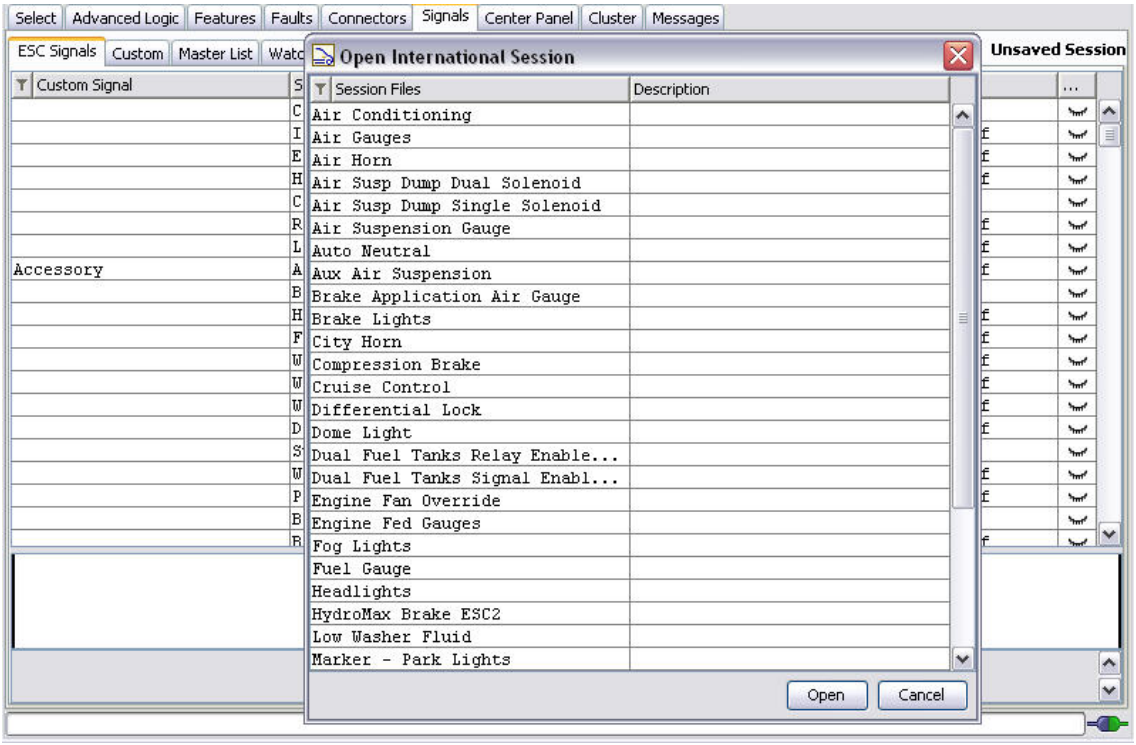


While in diagnostic mode, you can monitor the signals in a graphical format and save this information in individual sessions. This is useful for e-mailing or reviewing diagnostic scenarios later or for sharing with another user.

Click the Graph Tab, and then go to the Diagnostics drop down menu at the top of your screen. A variety of choices will be seen. Open a session by selecting Open Session > International

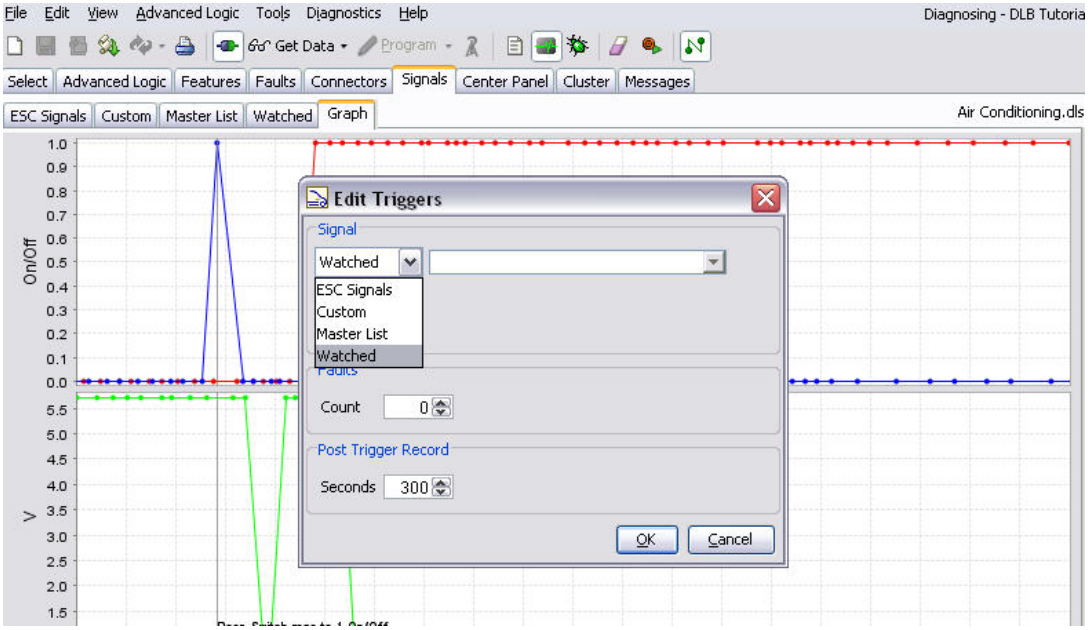


In this case, click on open session and locate the Air Conditioning file.

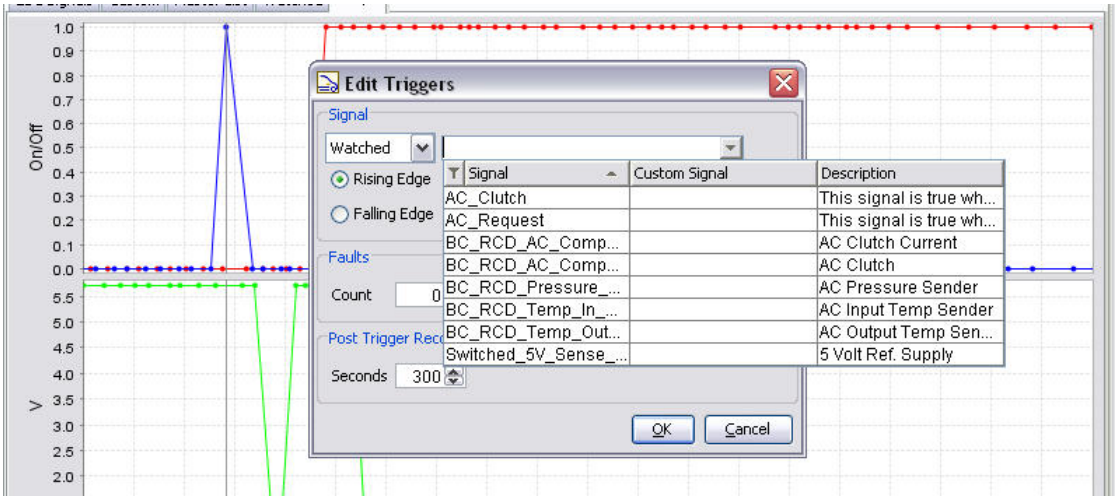


N

Next, click on Edit Triggers under the Diagnostic drop down menu. This is where the user can select which signals to monitor and graph in the session. In the Edit Triggers dialog box, first select from the signal drop down box in the upper left of the screen. Select “Watched” for this session.

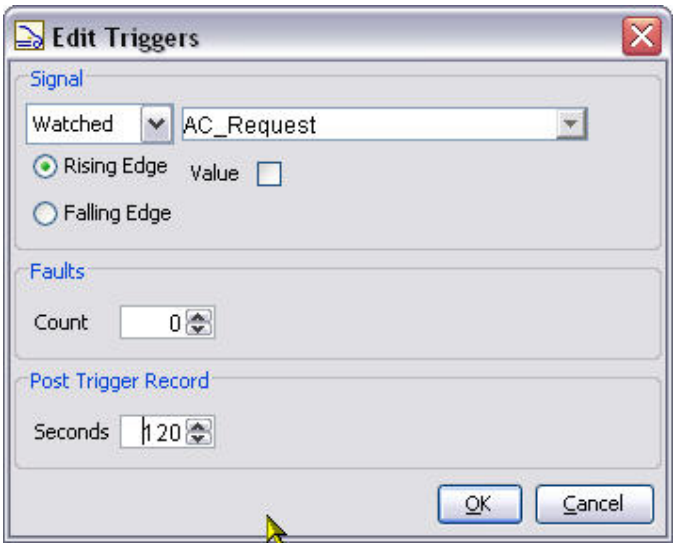


Next, go to the dialog box in the upper right of the screen and click on the down arrow. This will display all the signals the user has selected to watch. Here you will see the AC_Request input signal. Highlight this choice.

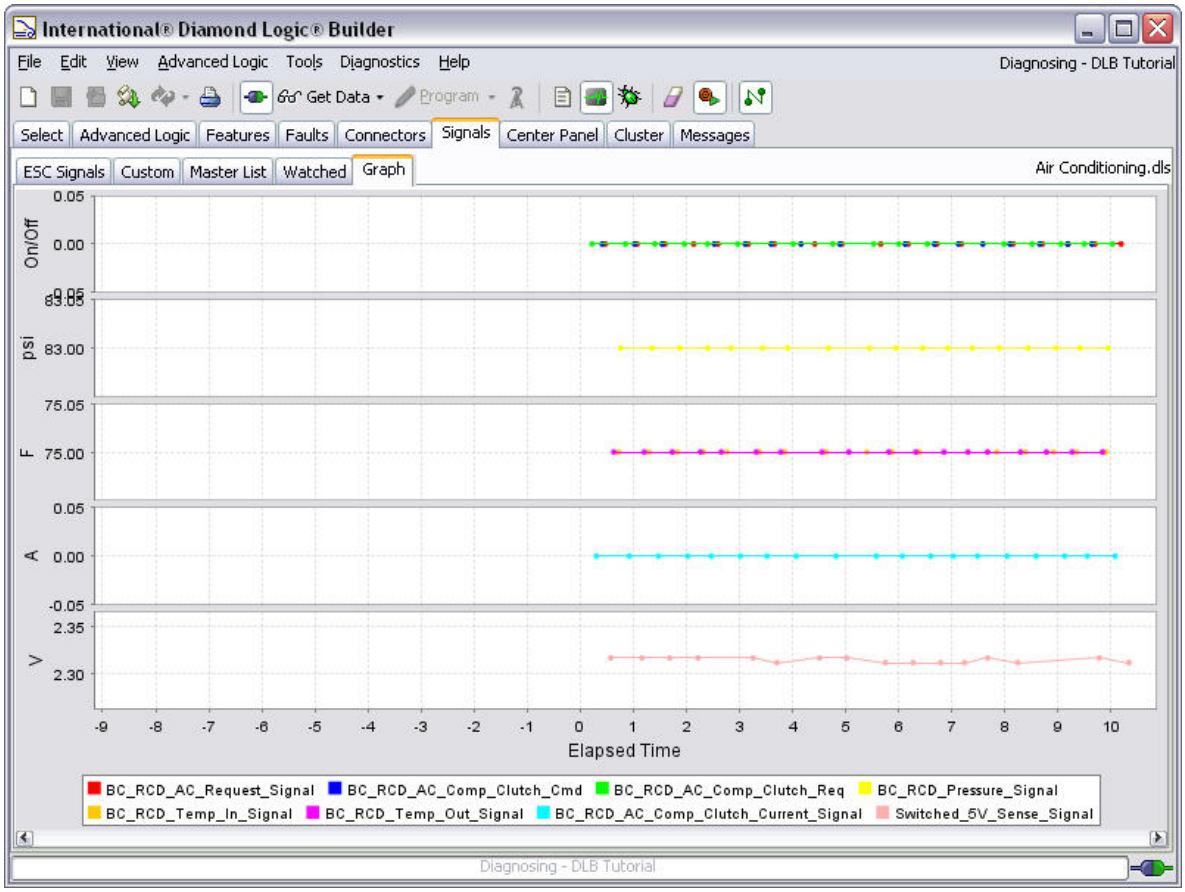


.

Next, select the number of seconds you wish to record after the conditions are met. In this case, monitor it for 120 seconds. Enter this value at the bottom of the screen, and then click OK.

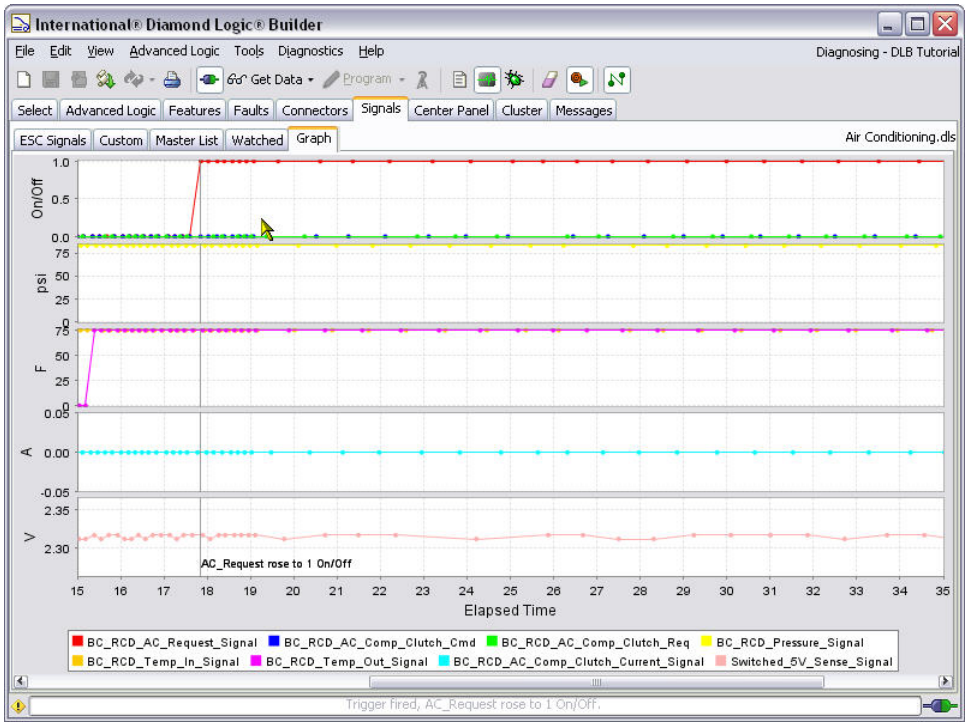


Locate the Signal Trigger icon located on your toolbar. This icon can turn on/off your recordings and also arm/disarm your signals.

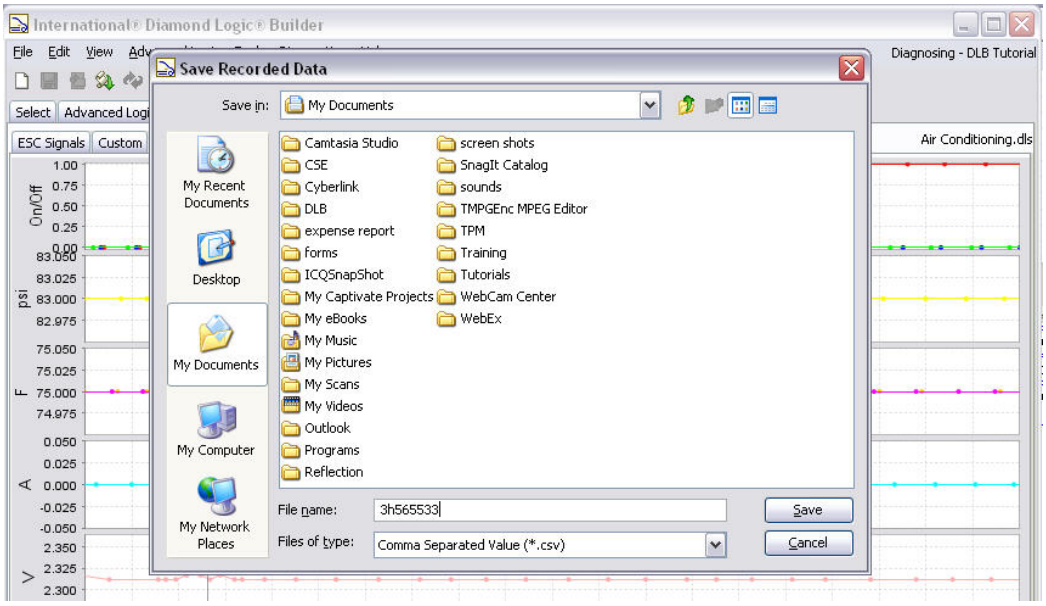


Clicking on this icon will start the recording session. Once the session is running, your graph will start to move. Turn the AC request on to see the graph change and the

trigger set. Once the trigger sets, the recording will automatically stop after the post trigger time has expired.

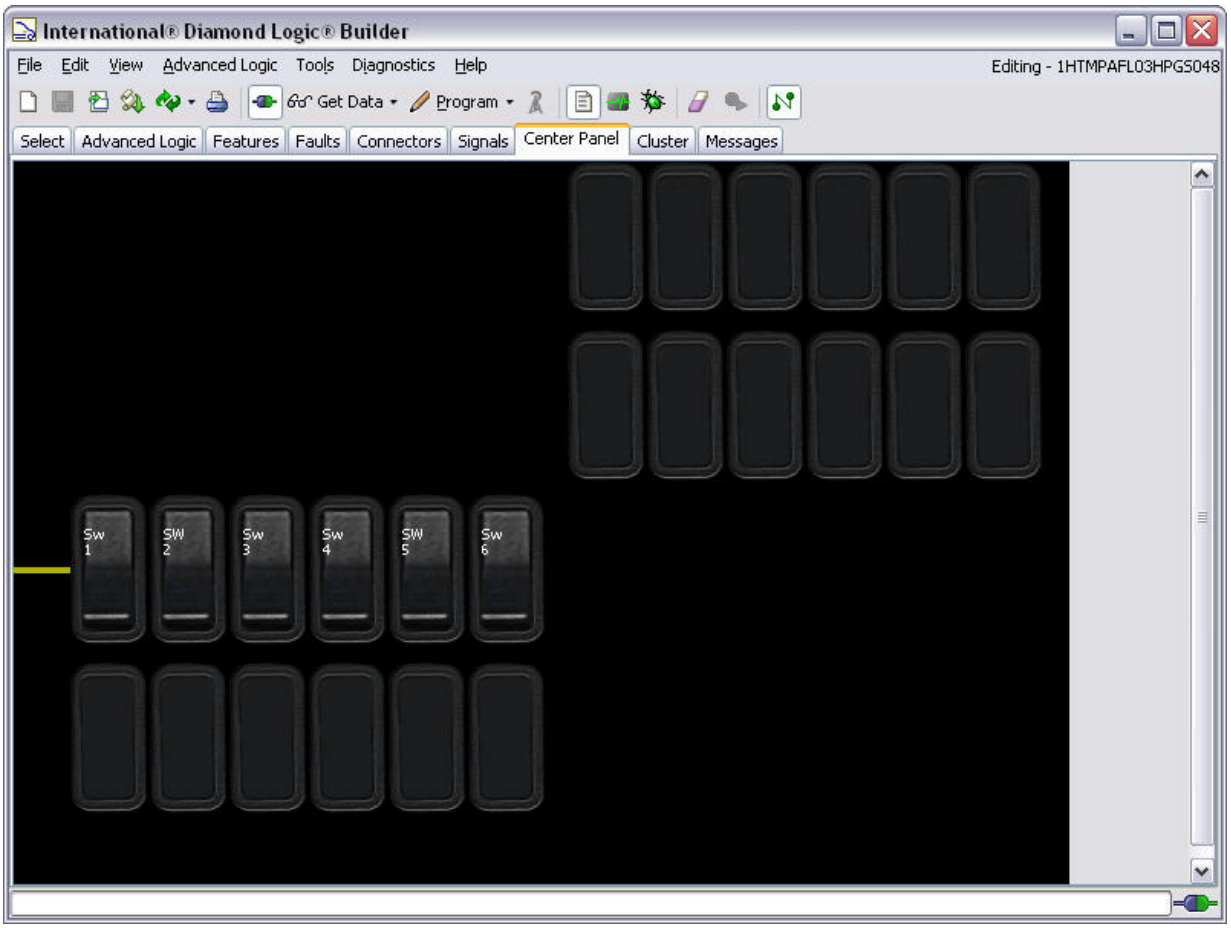


Custom sessions can be created and saved for later reference. Click on the Diagnostic drop down and click on Save Session As. Name the session appropriately. (Note: Be sure to note where your session is being saved to make it easy to find later) The user could also just save the graphical data if desired by selecting save graph data from the diagnostics drop down menu.

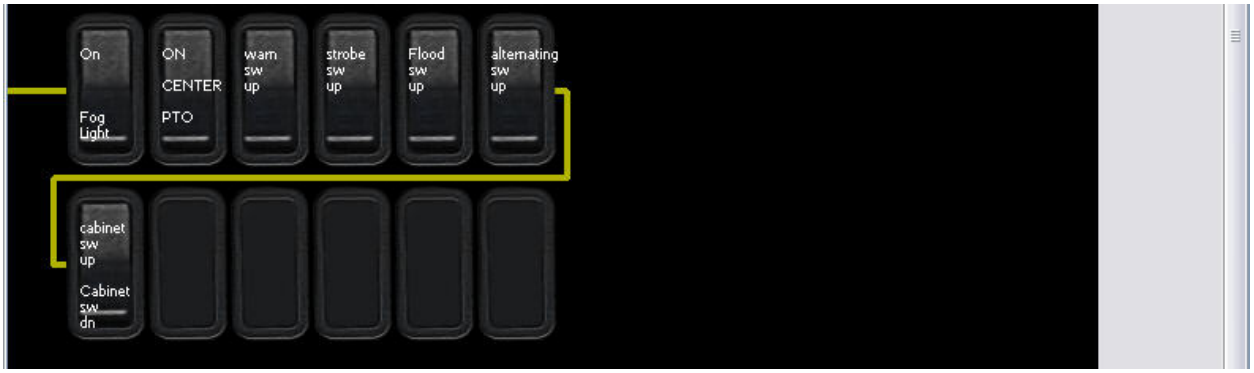


Center Panel Tab

The Center Panel Tab allows the user to view the vehicle Switch Panel arrangement. Horizontal and vertical scroll bars appear when needed for full view.

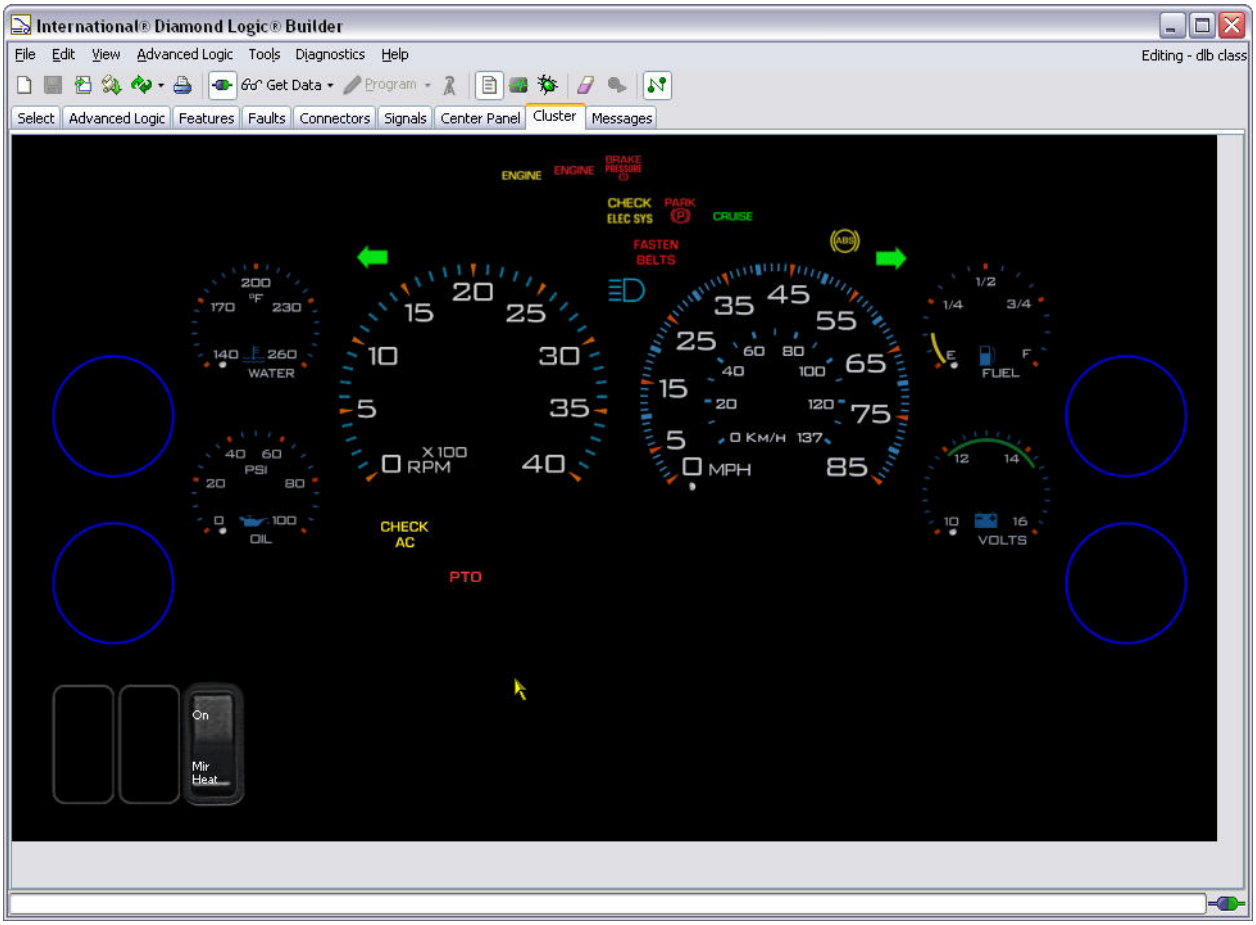


A wire connection as shown below appears when a second switch pack is present and populated.



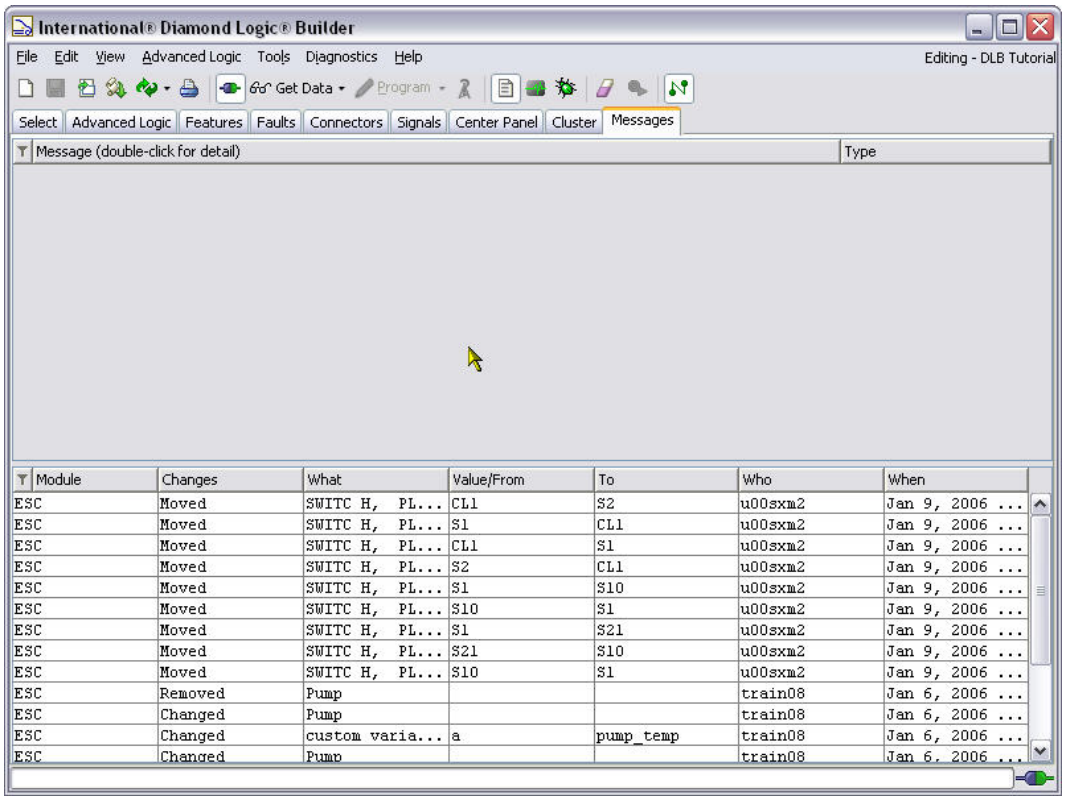
Cluster Tab

The Cluster Tab allows the user to view the vehicle cluster gauge and warning light arrangement, as populated by the features enabled in the vehicle configuration. The gauge positions identified with a blue circle are for optional gauges. When installed, these optional gauges may be moved between these four locations. All other gauges and warning lights have a fixed position. Full view of this screen is accomplished via movement of the horizontal and vertical scroll bars.

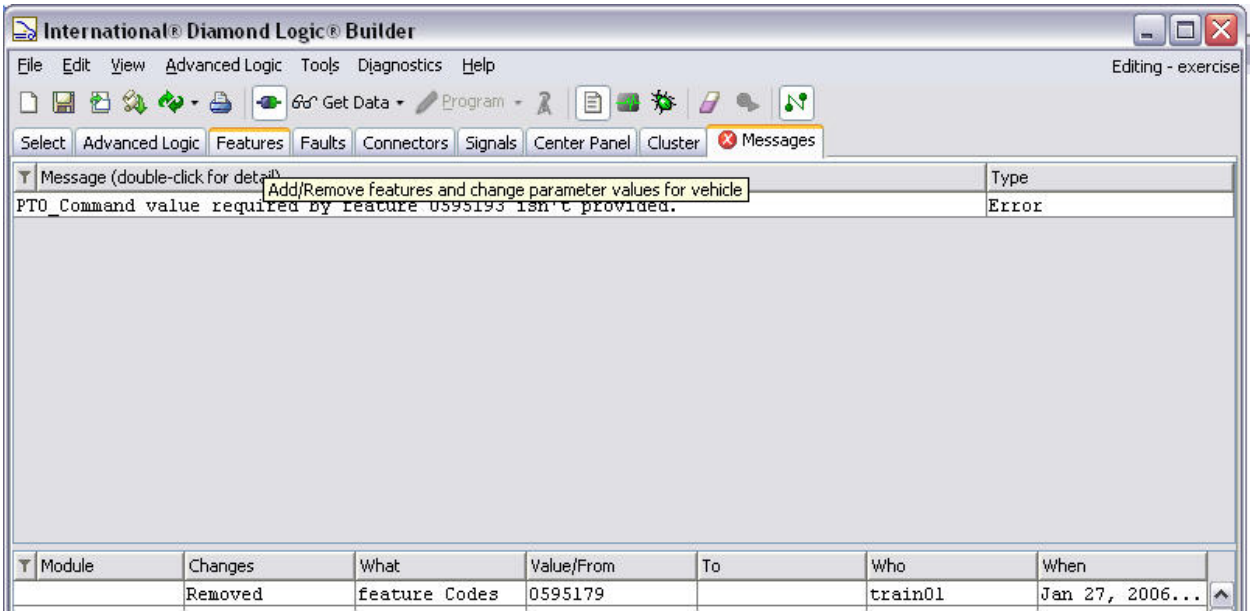


Messages Tab Main Screen

The Messages Tab allows the user to view configuration errors and warnings.

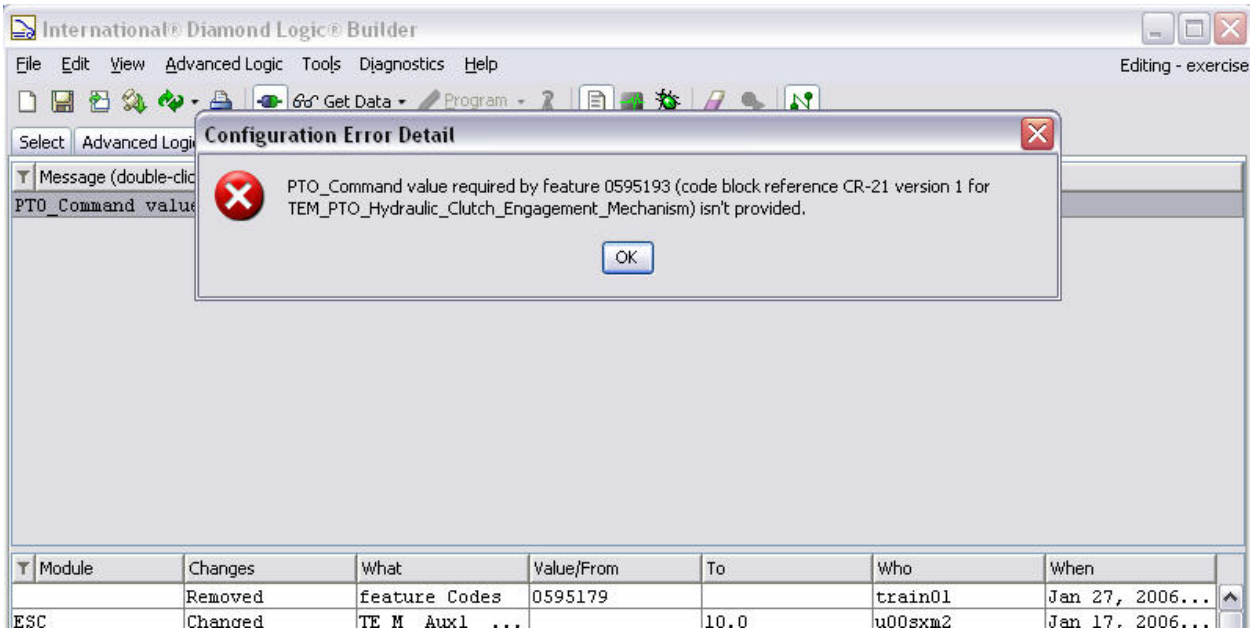


Messages Tab Error Screen



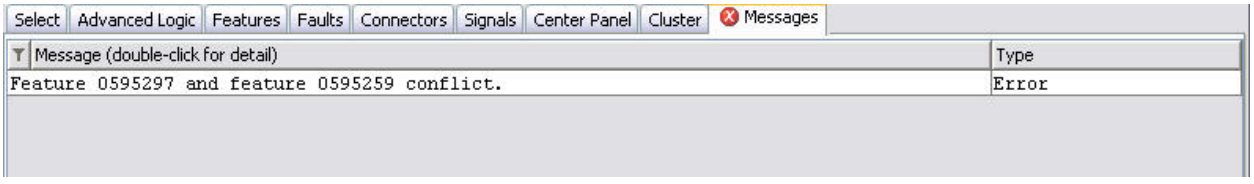
Messages Tab Error Detail

When one of the upper windows lists is double-clicked, the configuration error detail will be displayed in full detail. The display has the same information contained in the Long Message column listed item.



Types of Errors (What do they Mean?) – Some of the errors seem to be somewhat cryptic at times but listed below are some examples of error messages and what causes them:

Feature 595xxx and Feature 595xxx conflict – This error is generated when attempting to add two features that conflict with one another. For example, if the user tries to add 595259 (a feature for normally closed solenoids) and feature 595297 (a feature for normally open) this will generate this error because the two different types of air solenoids are not compatible at the same time.



XXXX value required by feature 595XXX isn't provided – This error is generated when parameters that are required by a feature are missing. For example, this error will be generated if the user tries to add 595179 (ESC Programming for PTO) with out adding a feature that would indicate what type of PTO will be used.

Message (double-click for detail)	Type
TEM_PTO_Engagement_Switch_On value required by feature 0595179 isn't provided.	Error
TEM_PTO_Non_Neut_Alarms value required by feature 0595179 isn't provided.	Error
TEM_PTO_Non_Neut_Disengages value required by feature 0595179 isn't provided.	Error
TEM_PTO_Non_Neut_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Neut_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Veh_Spd_Alarms value required by feature 0595179 isn't provided.	Error
TEM_PTO_Veh_Spd_Disengages value required by feature 0595179 isn't provided.	Error
TEM_PTO_Veh_Spd_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Eng_Spd_Alarms value required by feature 0595179 isn't provided.	Error
TEM_PTO_Eng_Spd_Disengages value required by feature 0595179 isn't provided.	Error
TEM_PTO_Eng_Spd_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Cltch_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Brake_Engmnt_Inhib value required by feature 0595179 isn't provided.	Error
TEM_PTO_Eng_Run_Alarms value required by feature 0595179 isn't provided.	Error

When you add a feature (for example 595252 – Electric over Air, Non Clutched) that contains the parameters required by 595179, the error will clear.

Simulation Error – This error will be generated if the user attempts to simulate a program, within DLB, that will exceed the ESC's processing time.

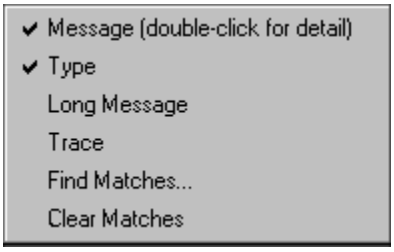
This error is displayed as a pop on the screen that the user is currently viewing.

In order to eliminate this error, have the dealer or Body Builder reduce the number of rungs used within Advanced Logic or reduce the number of features (595XXXX codes) applied to the truck.

Messages Tab Upper Window Column Headings

The Messages Tab upper window column headings can be selected and adjusted.

The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings. They are listed and defined as follows:

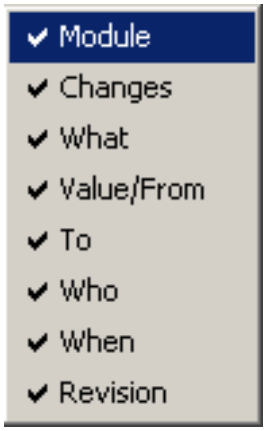


Name	Description
Message	Displays a particular error. Double clicking will invoke a pop-up window to display a long description.
Type	Describes the conflict.
Long Message	Displays the conflict in detail.
Trace	Trace is meant for debugging software errors and is of no use to .most Diamond Logic® Builder users. This column should be left off.
Find Matches…	Sort Matching Rows To Top.
Clear Matches	Clear Matches.

Messages Tab Lower Window Column Headings

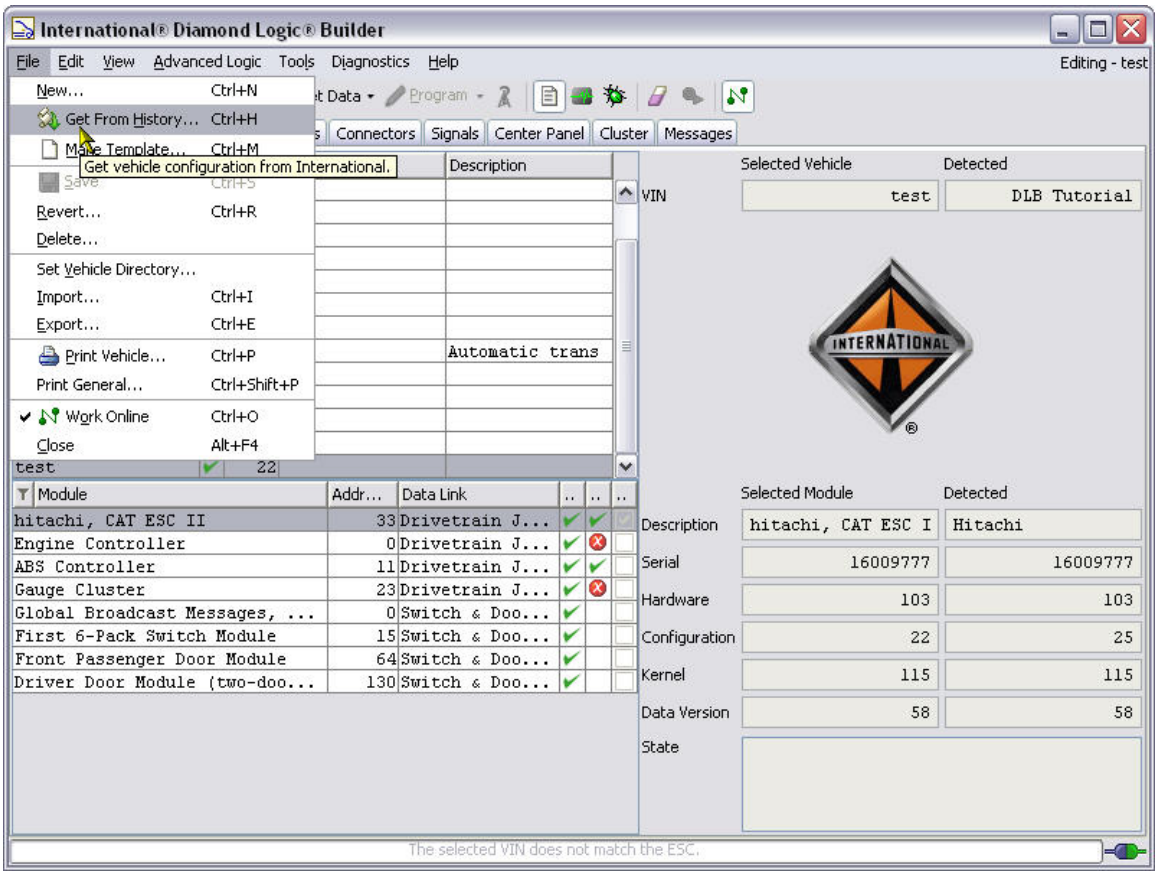
The lower window displays changes that have been made to a vehicle configuration since the last time it was programmed into a vehicle. This list will be cleared once the new configuration has been programmed into the vehicle and a new “READ” operation has been performed on the vehicle electrical system controller. The column headings can be selected and adjusted.

The column dropdown will appear after you right click on any column heading. Listed items that are checked will appear in the column headings. They are listed as follows:

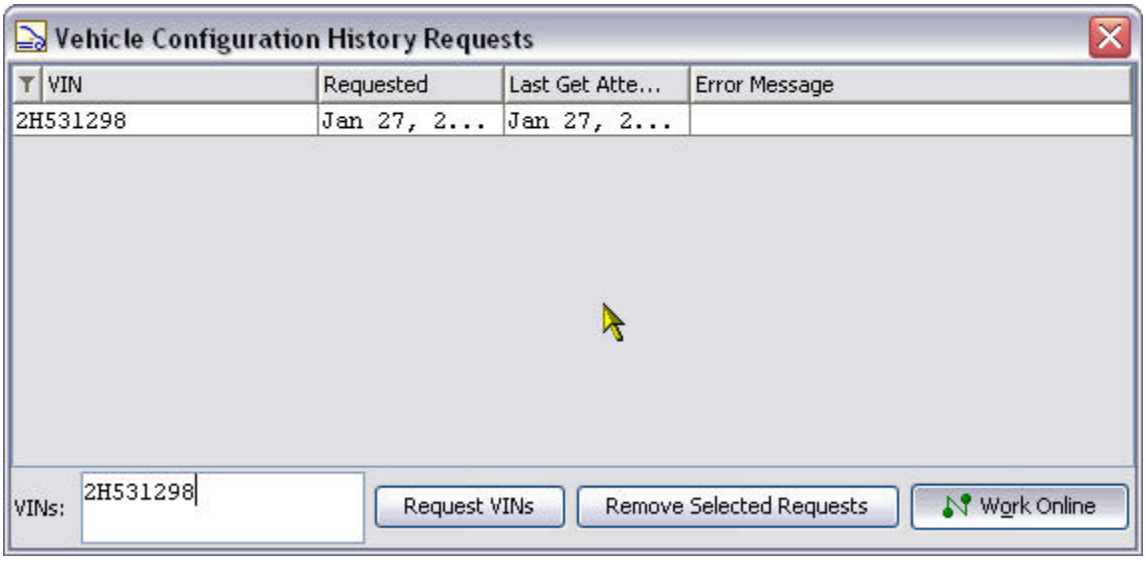


SECTION 9 How do I determine the vehicle's current configuration?

There are two options available to get a vehicle's history. The first option is to click "File" and then click "Get From History". The computer must be online connected to the Internet to get vehicle information from history. The following screen is displayed.

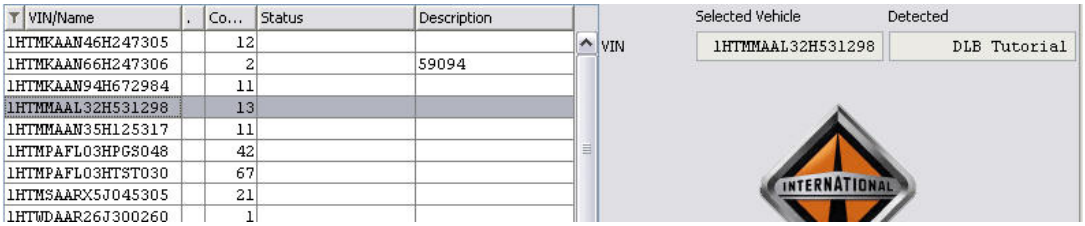


Once Get From History is selected, the Vehicle Configuration History Requests dialog box appears. Type the vehicle VIN or the 8-digit chassis number in the VINs dialog box. Select the 'Request VINs' button, the VIN requested appears in the list.



Depending upon the usage of the Vehicle History Service by other users, the system will load your requested vehicle configuration file onto the computer. This will take between a few seconds to a few minutes. If the user already has a previous copy of the VIN file on your computer, a confirm Overwrite screen appears. Selecting “Yes” will allow the user to overwrite the existing vehicle configuration file on the computer. Selecting No voids the whole process.

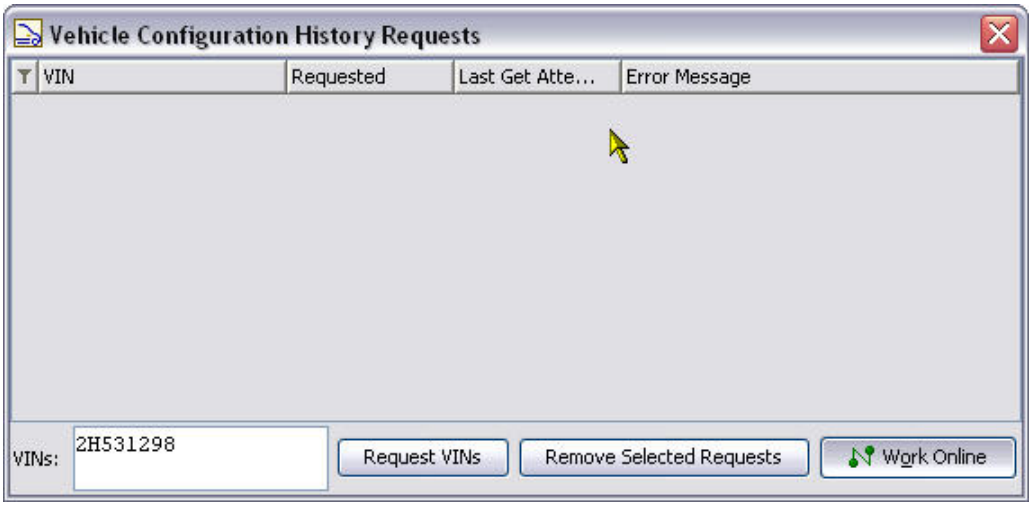
Selecting "Yes" overwrites the current vehicle configuration version on your computer and highlights the vehicle in the listing.



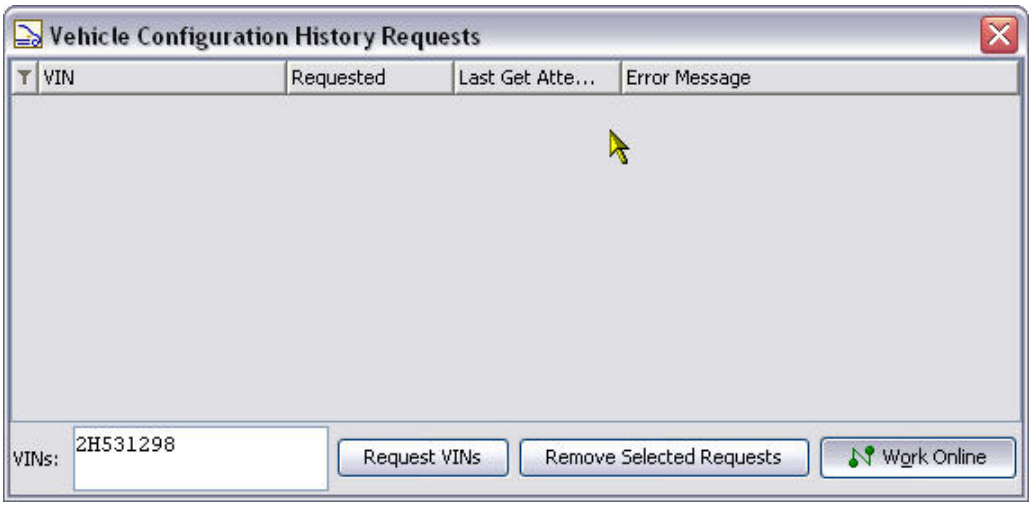
An alternative method is to click the “Get Vehicle Configuration from International” icon. All of the other above listed directions will apply.

306)721-9700

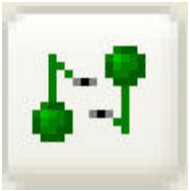
The Vehicle Configuration History Requests screen has two additional buttons: Remove Selected Requests and Work Online. Pressing the Remove Selected Request button will simply remove the selected VIN request from the list.



Selecting the Work Online button, will allow the user to work online or offline. Working "online" means that the user is connected to the Diamond Logic® Builder program resources at International through the Internet.



The signal icon will indicate a broken signal in the Toolbar button, Menu Bar File drop down menu and the Work Online button when DLB is being used **offline**.



Broken signal

The user can also get the vehicle information by simply connecting up to the vehicle. This is the most accurate way. If the user does not have a version of the vehicle's information already, connecting to the vehicle will automatically read the information contained in the ESC. If the user has a version but the vehicle is at a later revision, click the Get Data button to read.

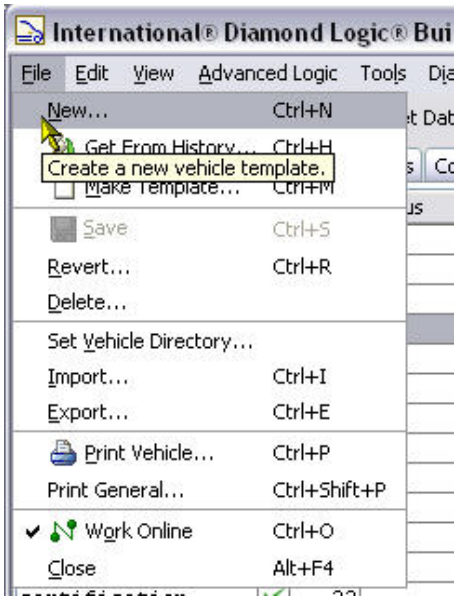
SECTION 10 How do I create and apply a template?

A template is a separate file that captures and stores vehicle configuration changes that have been performed using the Diamond Logic® Builder software. These changes can be any of the following:

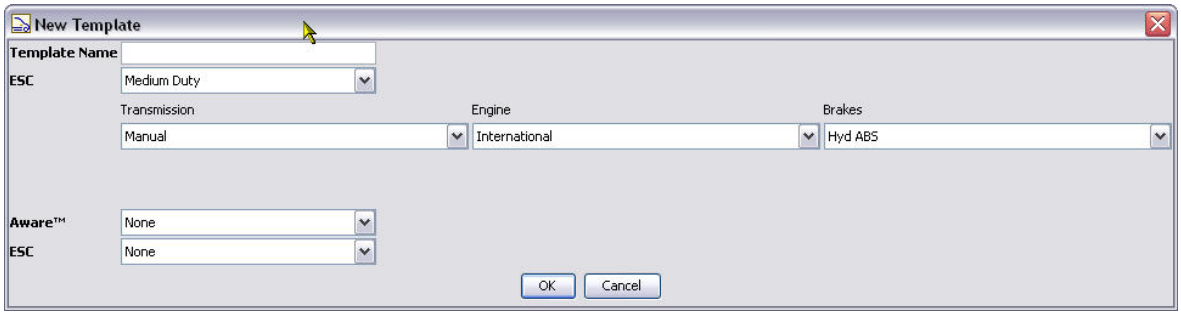
- Adding/Deleting 595XXX Features
- Changing Programmable Parameters
- Moving Pin, Switch or Gauge Locations
- Adding or Modifying Advanced Logic Blocks

A template is a programming guide that summarizes the features and parameter settings that are to be applied to a vehicle configuration. The template can be loaded to a vehicle and can be saved for future use on additional vehicles. Once a template is saved it can be exported or emailed just like any other data file. Multiple templates can be applied to a vehicle or a series of vehicles. Extreme caution should be taken when using multiple templates on the same vehicle. The user cannot use the same resources in two different templates and then program the templates on a vehicle. The overlapping resources will conflict. If multiple templates are use, the user must ensure that resources are used only once per vehicle. It is suggested that only one template be used on a vehicle therefore eliminating the chance of using resources more than once.

There are two options available to create a template. The first option allows for the total creation of a new template, for this option click File and then New.



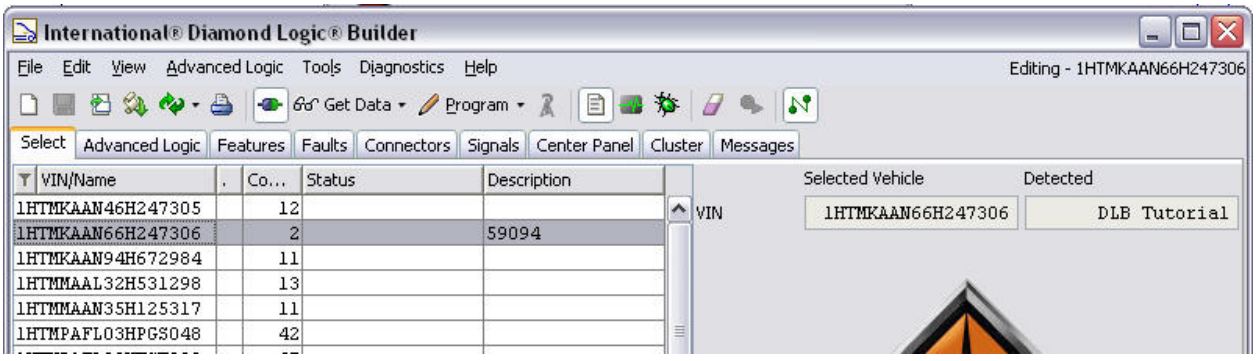
The following screen will be displayed.



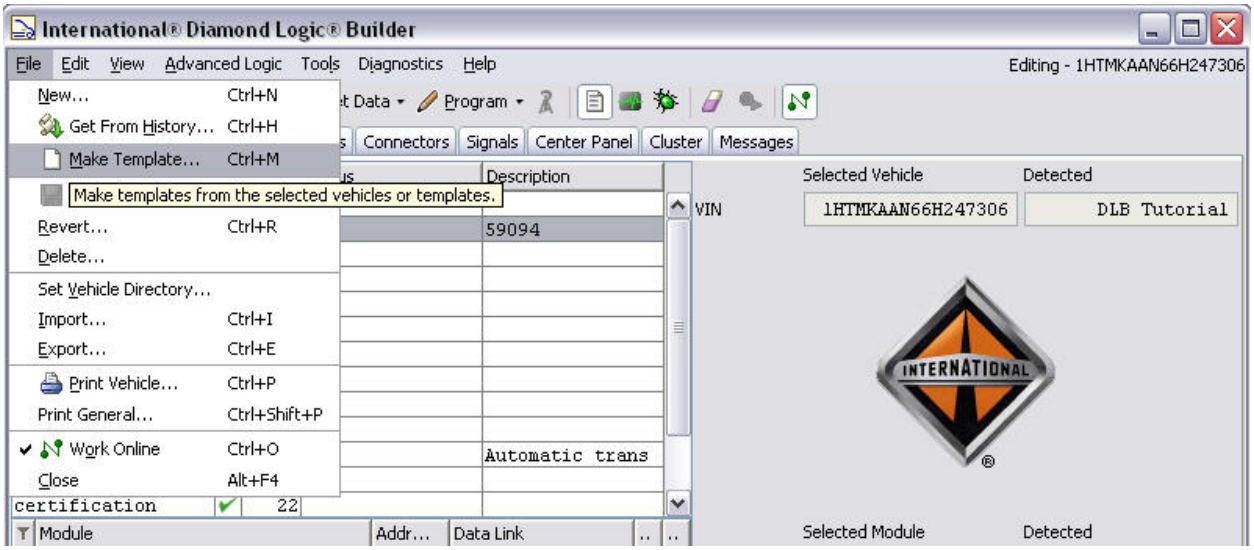
Enter a Template Name and select the applicable ESC, Transmission, Engine, Brake system and AWARE module (if applicable). Click on “OK”. The template should now appear under the select tab.

NOTE: The new template name must be 1-16 characters. The sixteen characters may not include spaces or special characters, except that the underscore symbol is allowed. If the name exceeds sixteen characters or contains spaces or illegal characters, you’ll receive this error message:

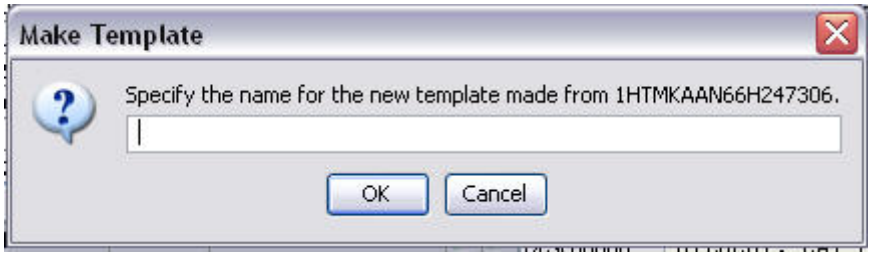
The second option is to select an already existing template or VIN. This will allow the creation of a template from an already existing template. This feature expedites the creation of a template if the new template is to differ in only a few options or attributes from the already existing base template.

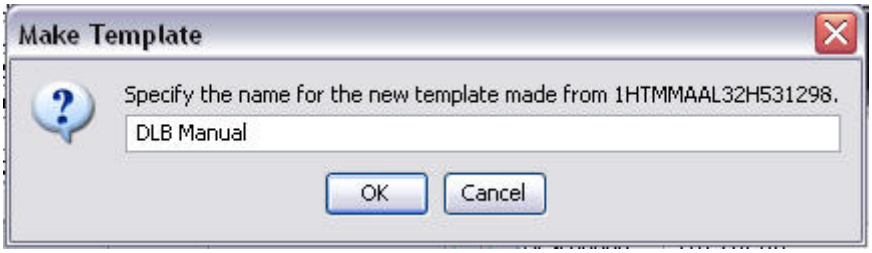


Click File from the menu bar then click Make Template from the File drop down menu.

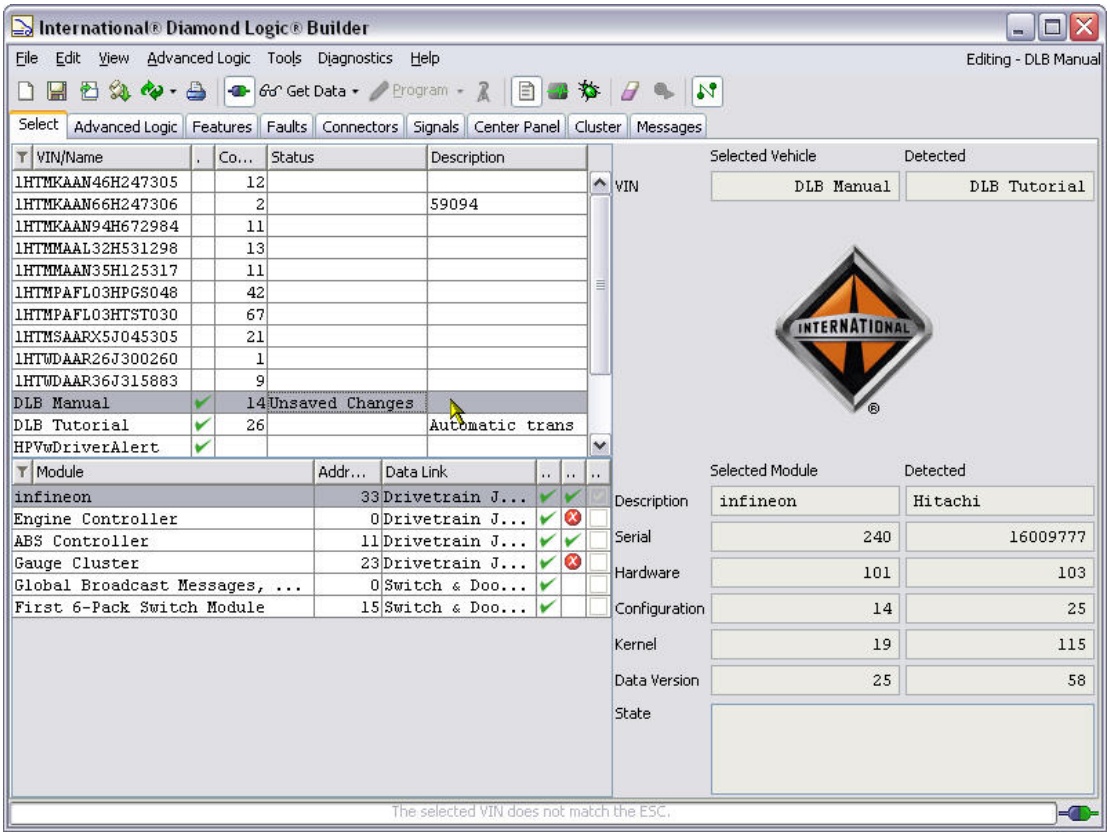


The following Make Template dialog box will be displayed. In the Make Template dialog box, type in a 1-16 character name for the new template.





The template you've just created appears in the list under the Select Tab.

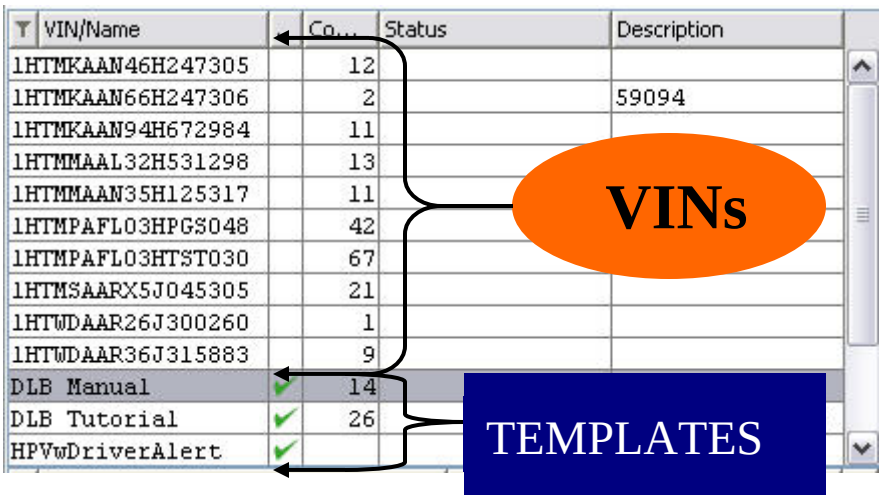


NOTE: It is extremely important to save and back-up copies of all templates created or changed. International does not store or retrieve templates. Until the templates are applied to a vehicle and the vehicle is programmed, they are just templates on your computer. International only tracks vehicle information that has been programmed into a vehicle.

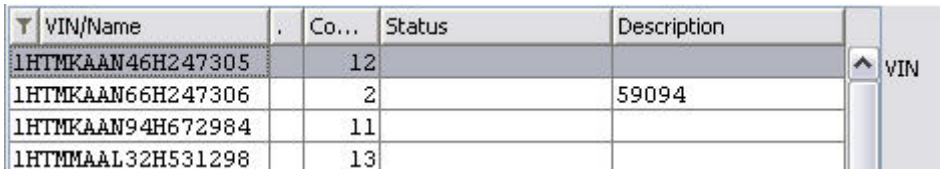
NOTE: It is highly recommended that the vehicle configuration be printed whenever modifications are made to a VIN. These modifications include (but are not limited to): adding, deleting, moving or modifying switches, features, advanced logic or outputs/inputs on the connectors.

The printed vehicle configuration should be stored with the vehicle for future reference in diagnostics, repair, and modification or re-programming.

Perform the following steps to apply a template and program a vehicle.

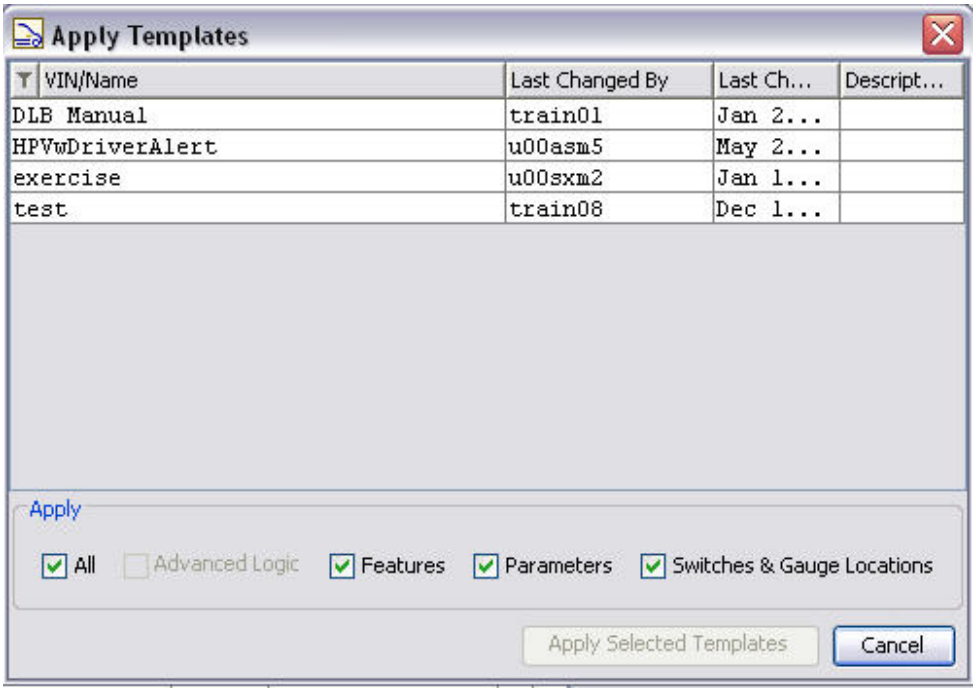


Select vehicle to be programmed.

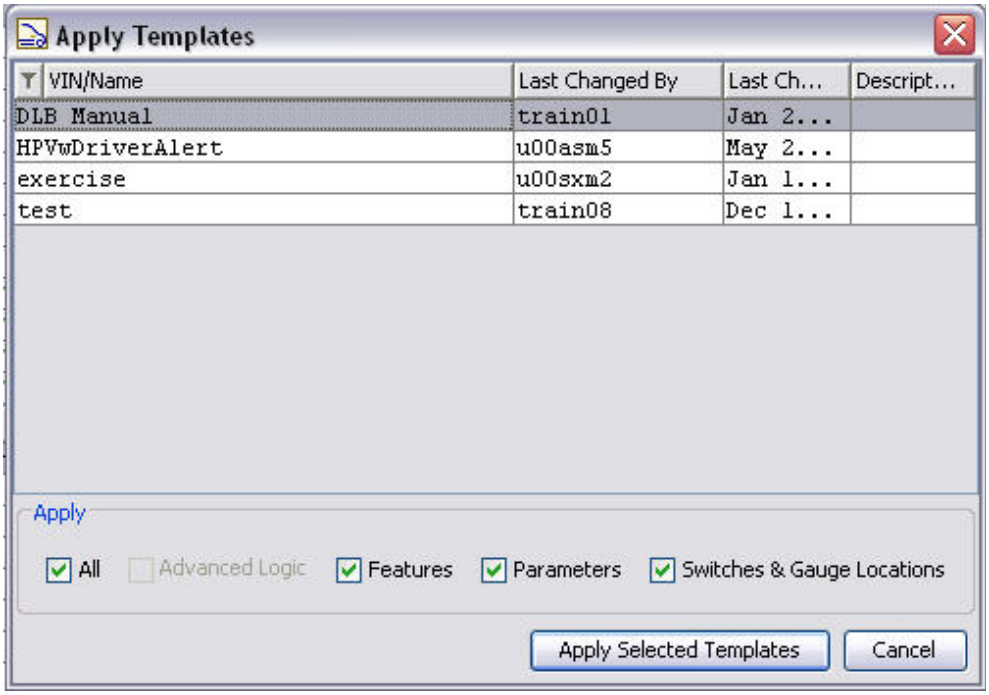


Click the Apply Templates icon. (If there are templates to apply)

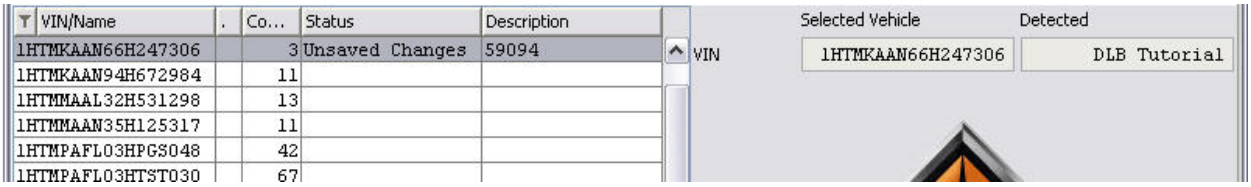
Apply Template dialog box appears.



Click on the Template to be applied. Select the lower apply buttons of your choice (i.e., Advanced Logic, Features, Programmable Parameters, and/or Switches & Gauge Locations). Click the Apply Selected templates button. It is possible to select and apply several templates to a vehicle.

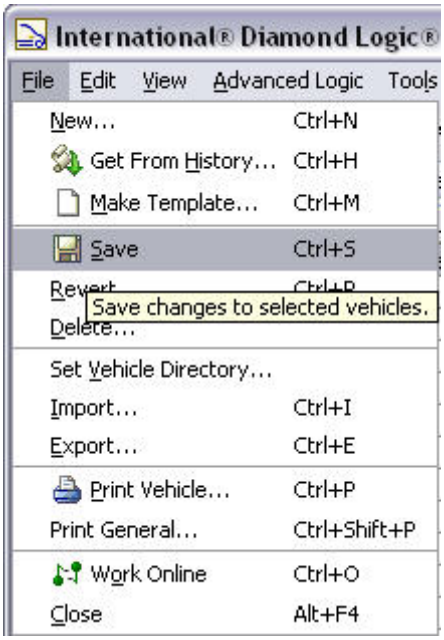


After applying the template, the selected vehicle displays “Unsaved Changes” in the Status column.



NOTE: It is highly recommended to use the Connectors, Signals and Features Tabs to verify the accuracy of the pins, switches and programmable parameter changes the user has made.

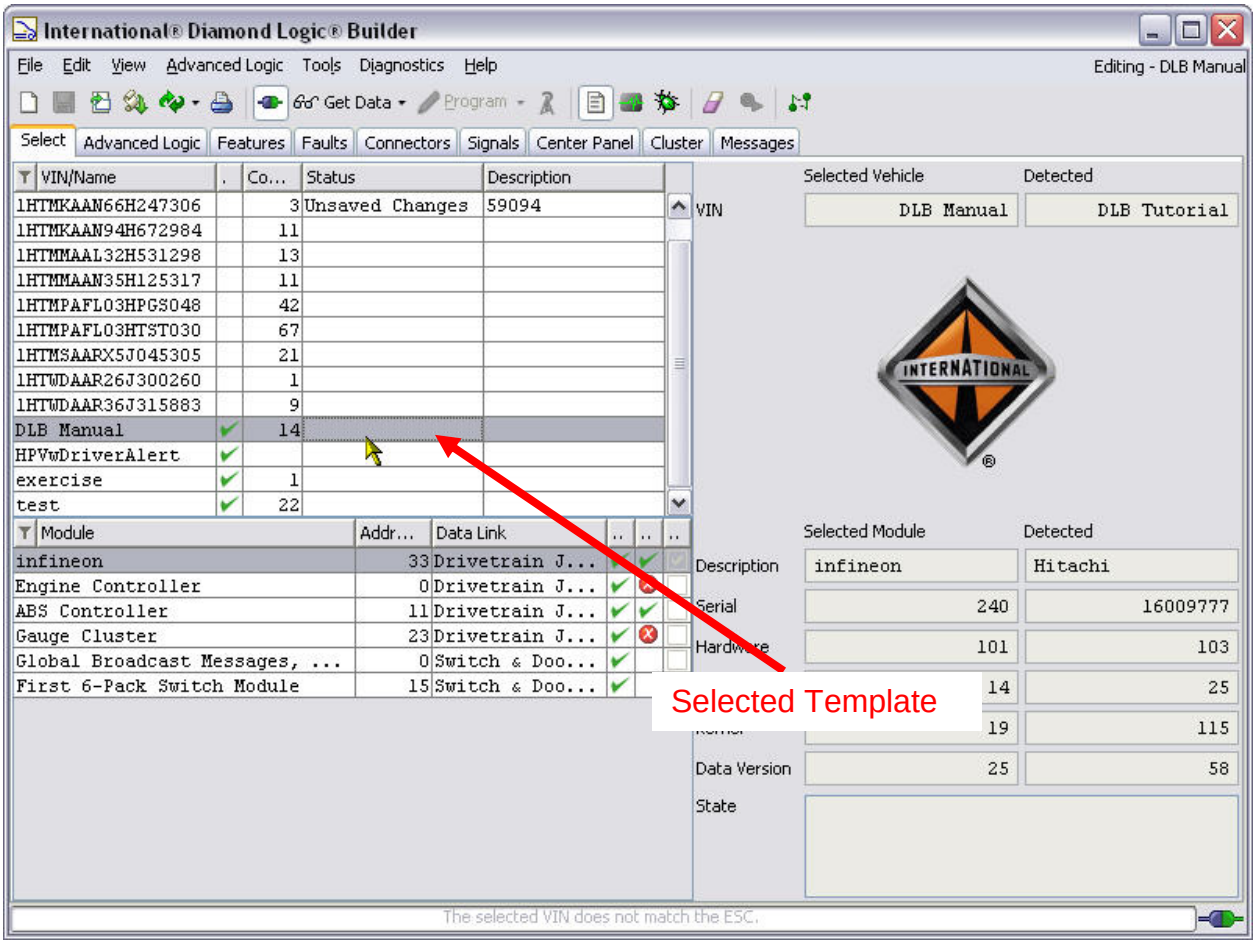
Select the “Save Changes to Selected Vehicles” icon.



Or click the Save icon.

SECTION 11 How do I add or remove a feature?

Go to the Select Tab screen and select the template or VIN to which the feature is to be added or deleted.



Go to the Features Tab. The upper portion of the screen lists all possible software features that have been engineered for the ESC.

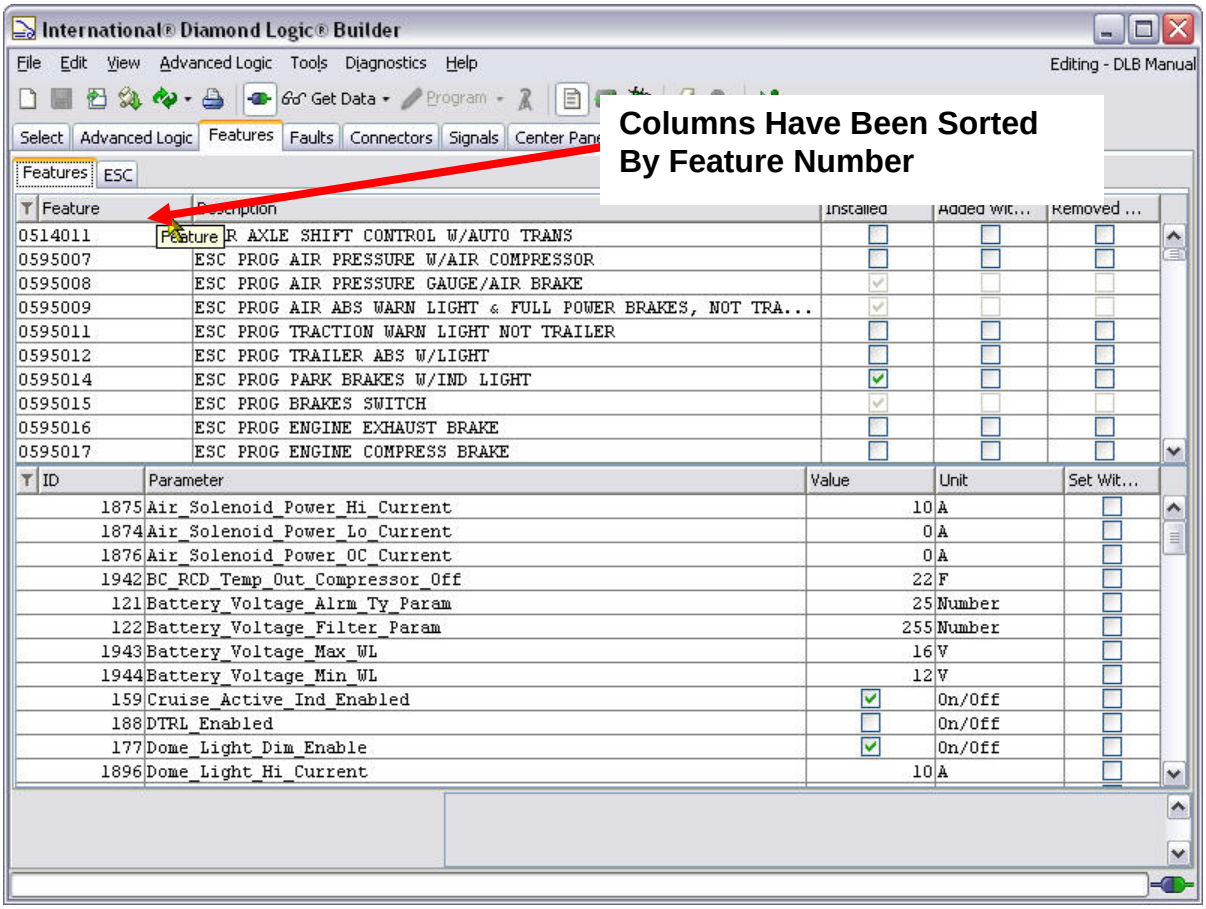
With a **VIN** selected the listing is organized in three different columns:

- The Feature column identifies the software part number for each packet of software code. These packets are referred to as 595 codes because the part number always starts with those three digits (595XXX).
- The Description column provides a short text description of the feature.
- The Installed column indicates the installed status of a feature for the vehicle configuration. A checked box indicates the feature **IS** installed in the vehicle's configuration. An Unchecked box indicates that the feature **IS NOT** installed in the vehicle's configuration.

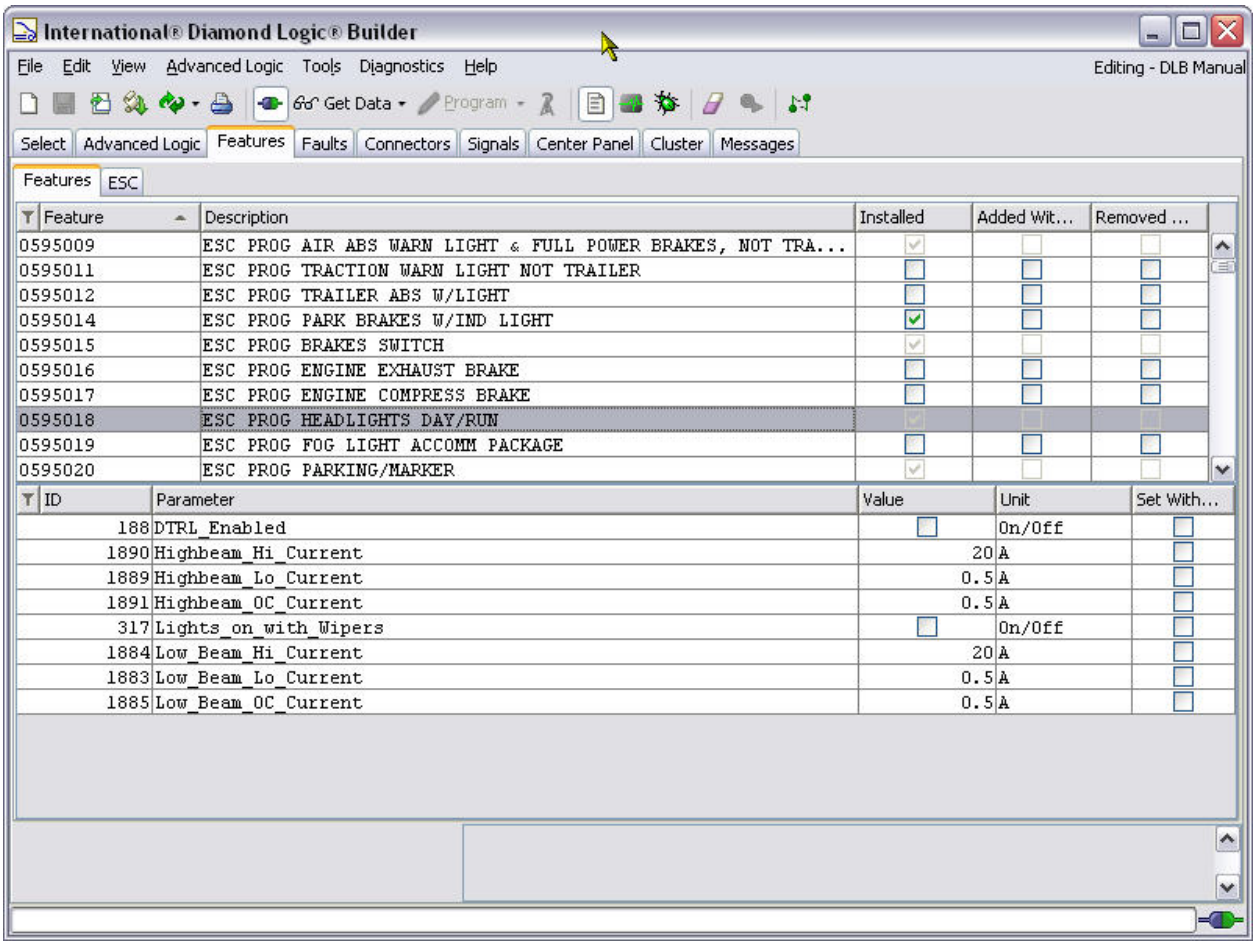
With a **template** selected the listing is organized in five different columns:

- The Feature column identifies the software part number for each packet of software code.
- The Description column provides a short text description of the feature.
- The Installed column indicates the installed status of a feature for the vehicle's configuration. A checked box indicates the feature **IS** installed in the vehicle's configuration. An Unchecked box indicates that the feature **IS NOT** installed in the vehicle's configuration.
- The Added with Template column provides the option to include features in VIN configurations when this template is applied. A checked box means the associated feature will automatically be included in all VIN configurations that have this template applied to them. An unchecked box has no effect on the template.
- The Remove with Template column provides the option to remove features from VIN configurations when this template is applied. A checked box means the associated feature will automatically be removed from a VIN configuration when this template is applied to them.

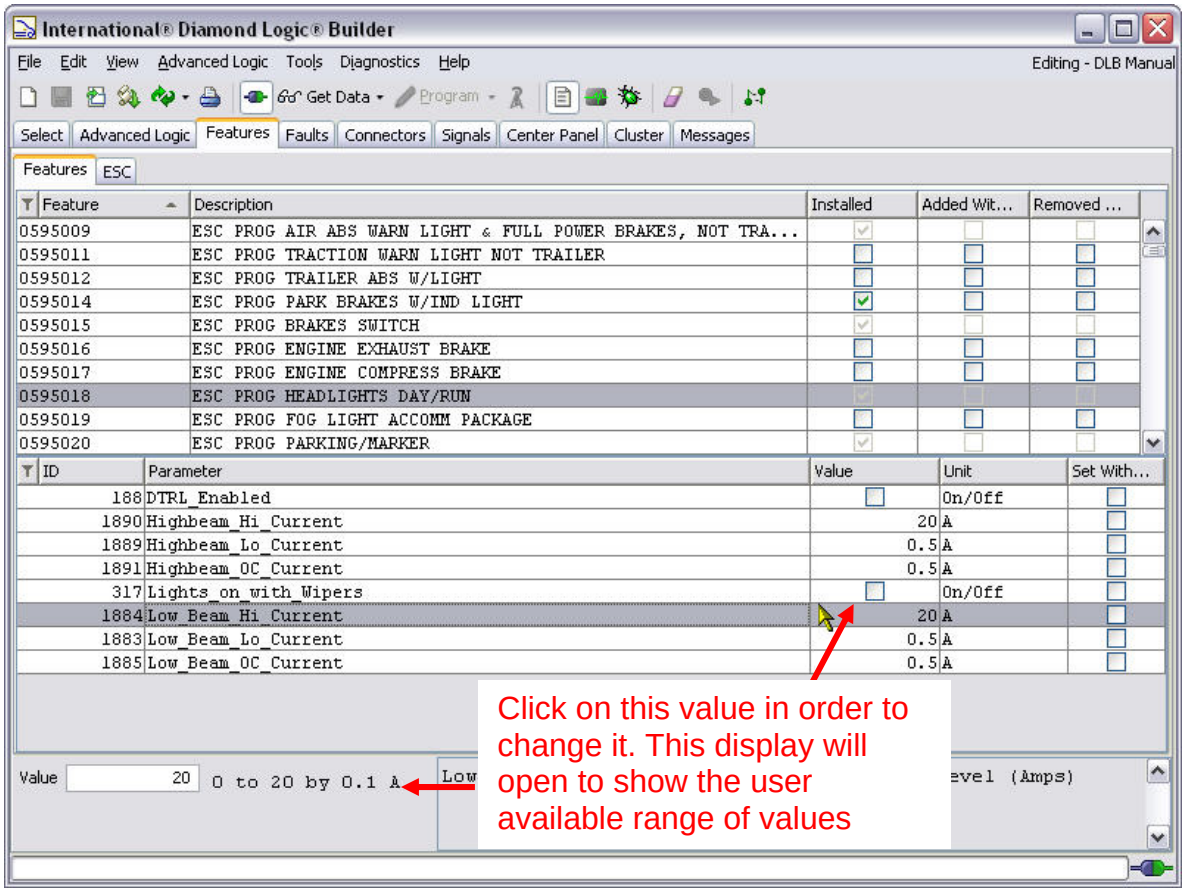
The listing of features may be sorted in multiple ways. Placing the cursor in any of the column headings followed by clicking the left mouse button will cause the entire table to be sorted in an ascending or descending order as defined by the column data.



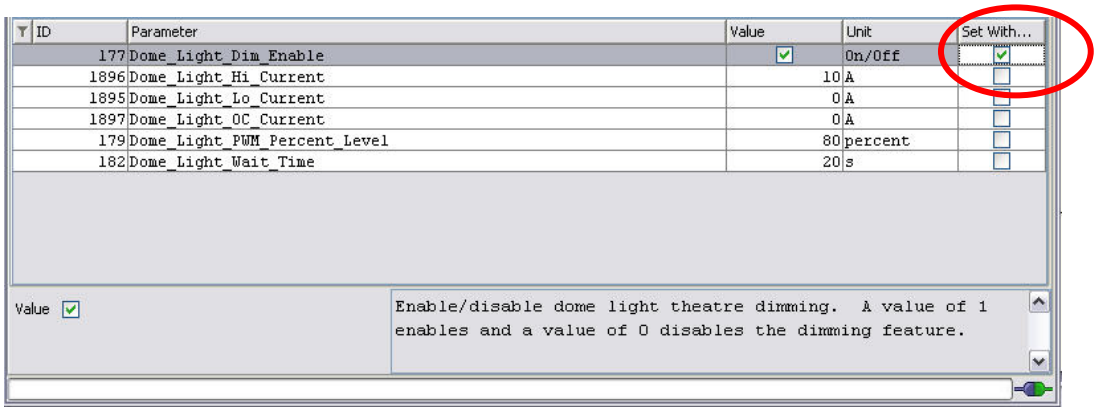
Scroll through the available features until the one to add or delete is found. Here we are going to add a feature to the template. After finding the desired feature, select it (highlighted). Notice the lower half of the screen is now populated with a list of programmable parameters that are associated with this feature. Not all features will have programmable parameters.



Clicking on the check box in the Installed column not only places a checkmark, but also invokes parameter windows in the lower portion of the screen. Selecting a parameter invokes the Parameter Program windows at the bottom of the screen.



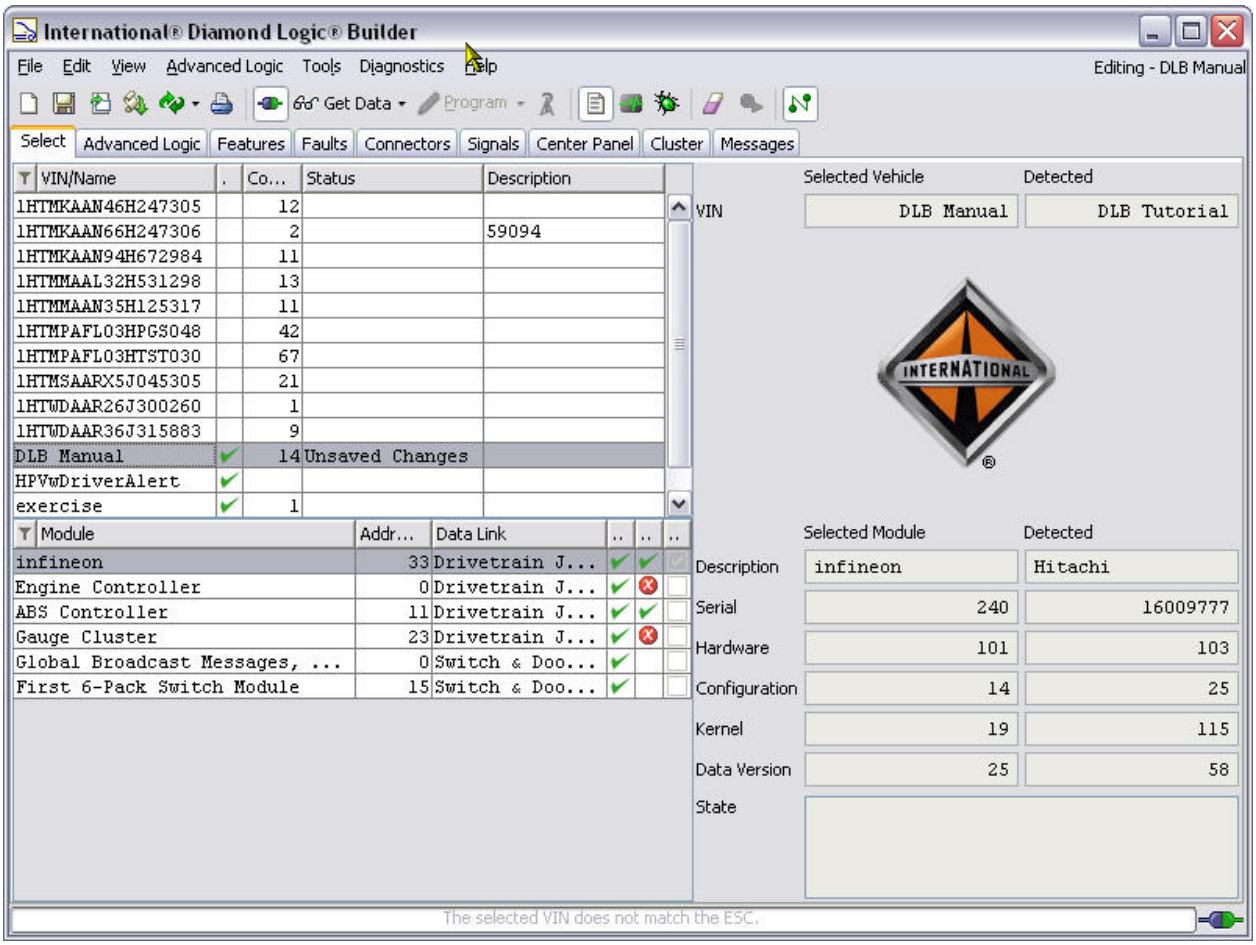
To change the value of a programmable parameter of an existing feature select the desired programmable parameter and then clicking on the data in the value column. If the parameter is merely an on or off selection there will be a check box. A checked box indicates the programmable parameter is on. An unchecked box indicates the programmable parameter is off. For programmable parameters with numerical values, merely select the value that is to be modified and then type in the new data value. Other programmable parameters provide the ability to make a choice from a list. Only one choice from the list may be selected for the feature file.



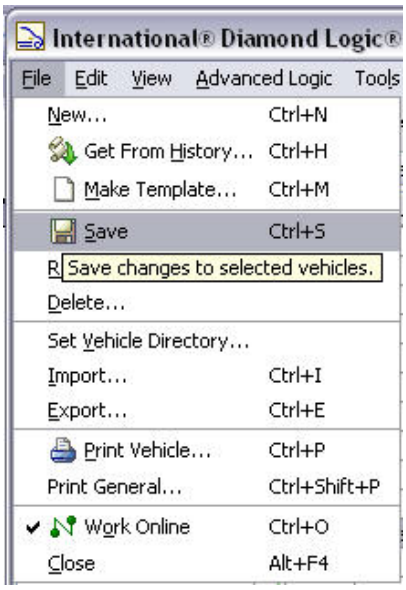
If the value of a programmable parameter is changed in a template, ensure that the associated box in the “Set With Template” is checked.

Once changes are completed the VIN or template must be saved and the file must be programmed into the vehicle for them to take effect.

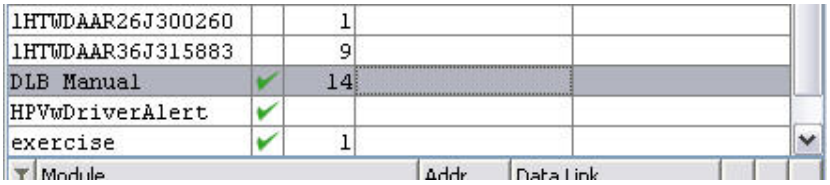
As long as changes are not saved, the option to change back to original feature and programmable parameter choices may be accomplished by using the Revert option. See Menu File Drop Down Menu. Once the file has been saved, removing feature or programmable parameter selections must be done manually.



The user can go to either the Menu bar and Click on File and select the Save option or select the Tool bar Save Changes To Selected Vehicles icon which has the appearance of a floppy diskette.



Notice the Status is cleared. Until the changes are programmed into a vehicle, they will not take effect.



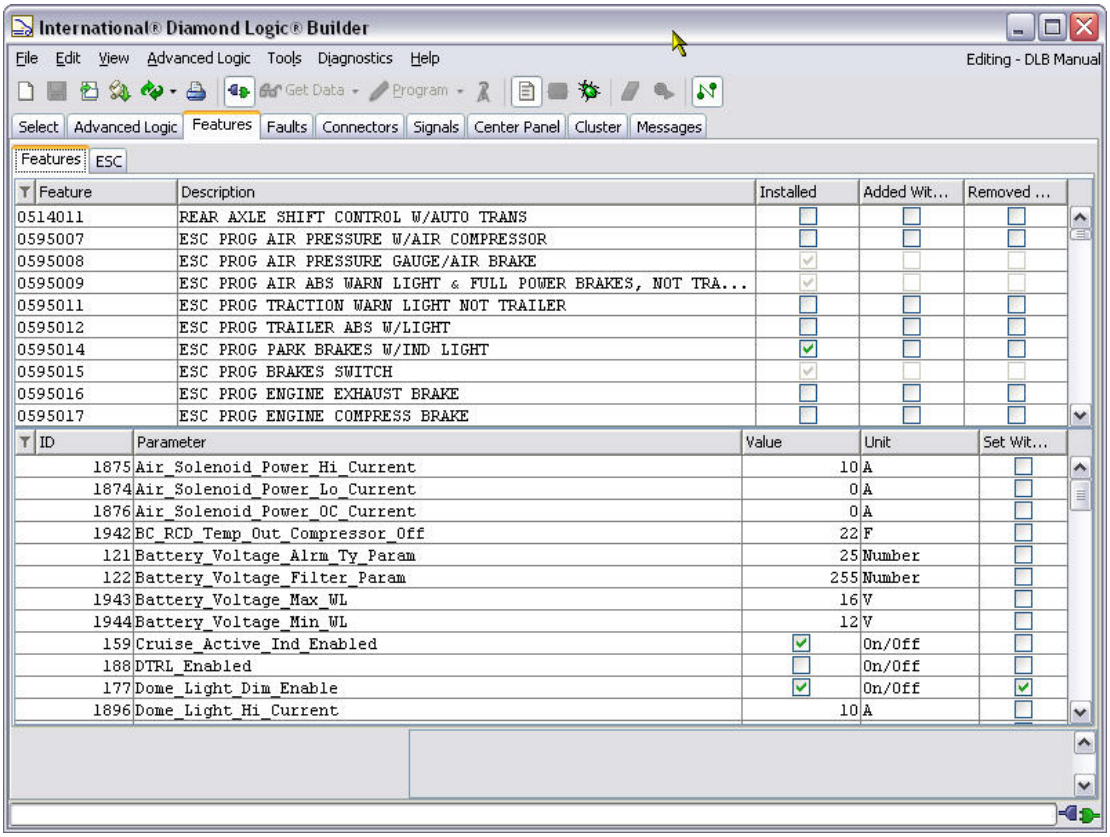
NOTE: Always refer to the CT-471 Body Builder Book (available on the ISIS® website) when adding or removing features or to diagnose and fix conflicts that may occur.

NOTE: It is highly recommended that the vehicle configuration be printed whenever modifications are made to a VIN. These modifications include (but are not limited to): adding, deleting, moving or modifying switches, features, advanced logic or outputs/inputs on the connectors.

The printed vehicle configuration should be stored with the vehicle for future reference in diagnostics, repair, and modification or re-programming.

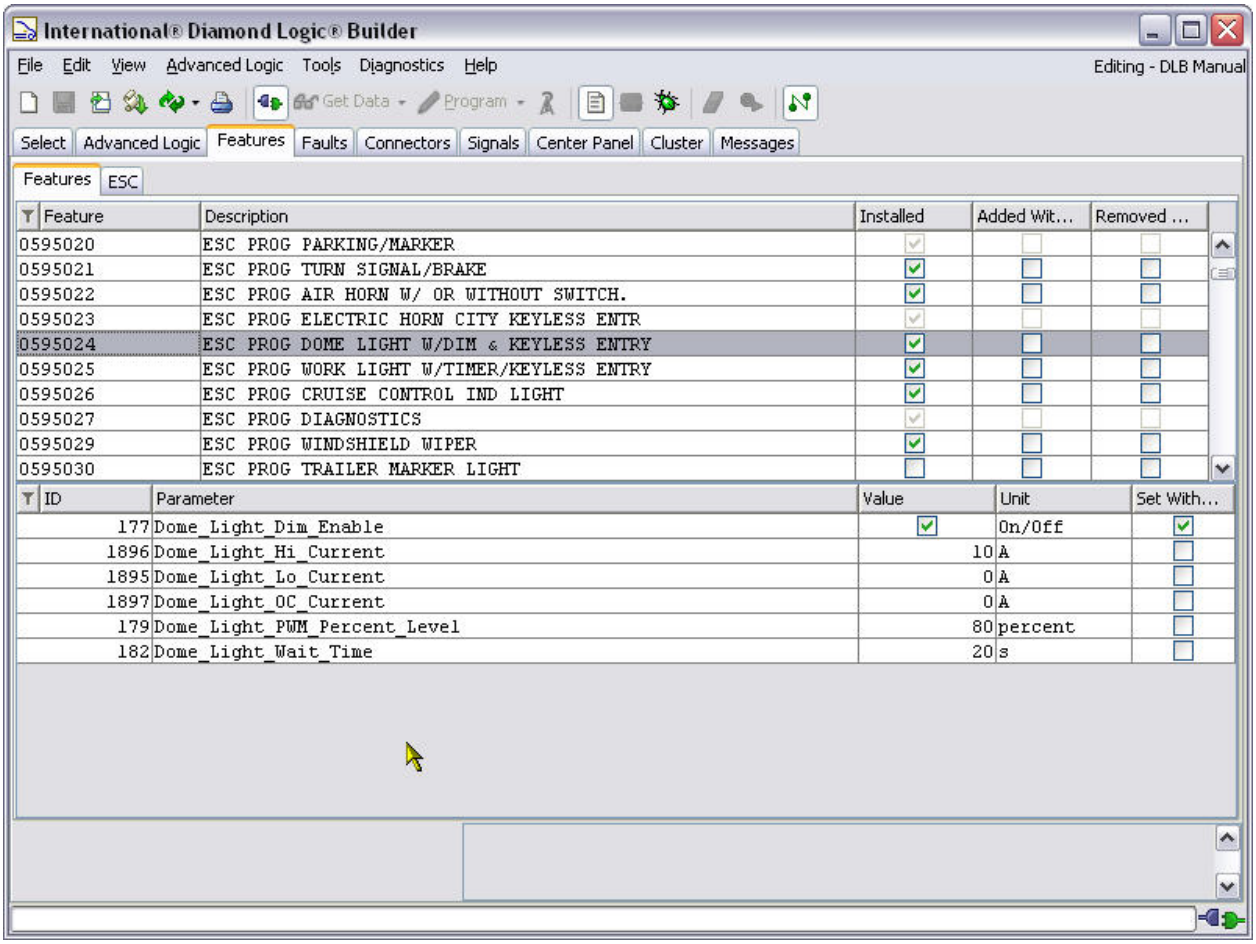
SECTION 12 How do I change a programmable parameter?

Go to the Features Tab. Listed are all the available features. The lower half of the screen lists all the parameters available to change on the selected vehicle or template, including their current value, units, and the ID.

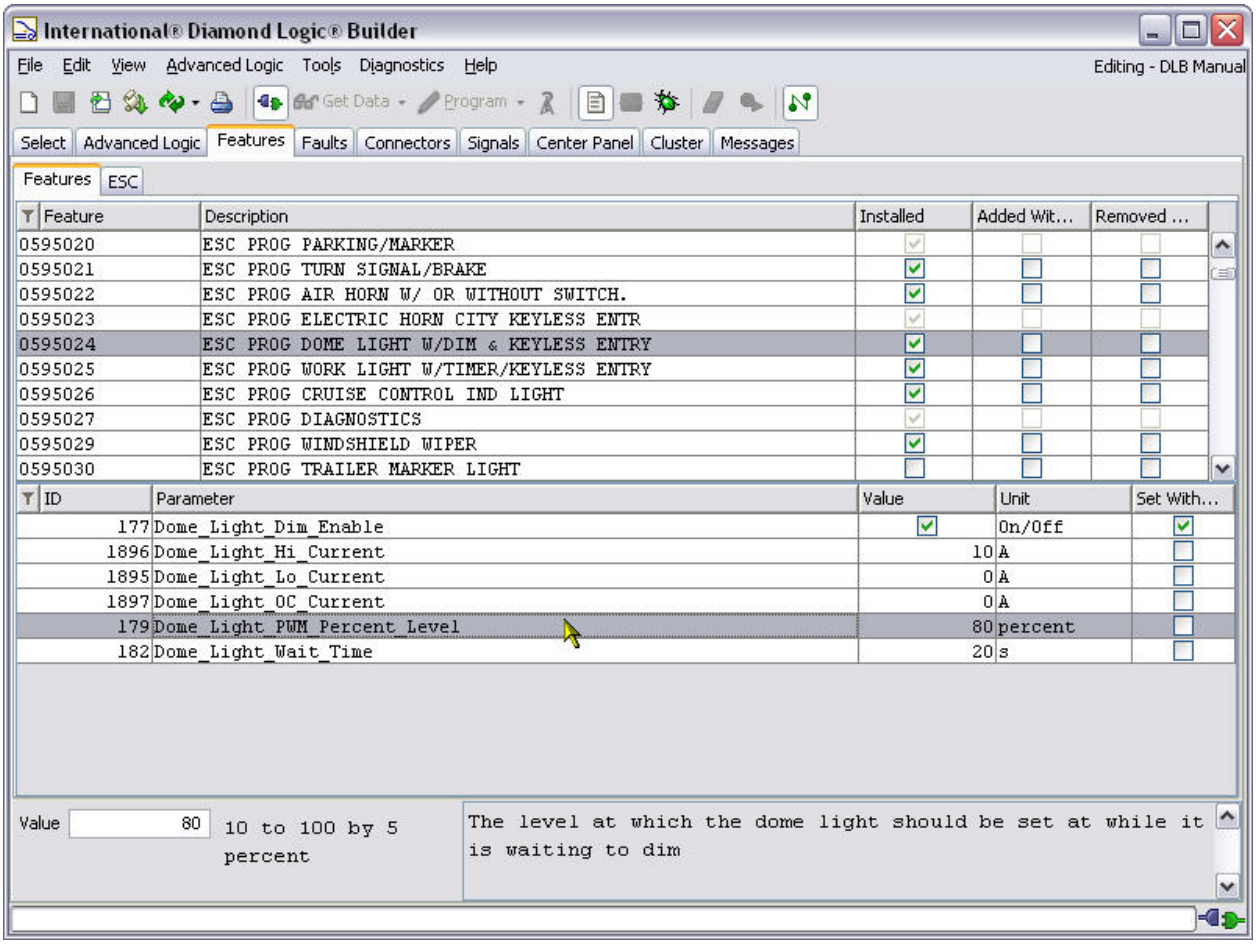


Scroll through the available features and find the feature with a programmable parameter that needs to be changed. When the feature is selected (highlighted), the lower half of the screen will be populated with only the programmable parameters that are associated with that feature.

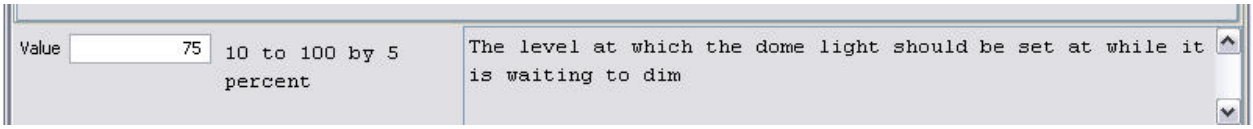
NOTE: Not all features will have programmable parameters. Programmable parameters may be modified in VIN configuration files or in templates.



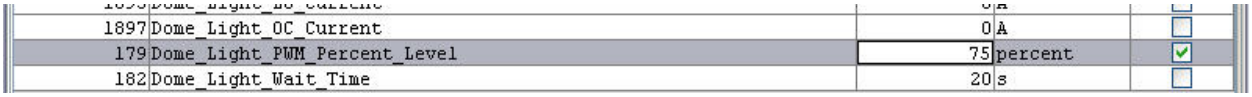
Clicking on the check box in the Installed column not only places a checkmark, but also invokes programmable parameter windows in the lower portion of the screen. Selecting a programmable parameter invokes the Programmable Parameter Program windows at the bottom of the screen.



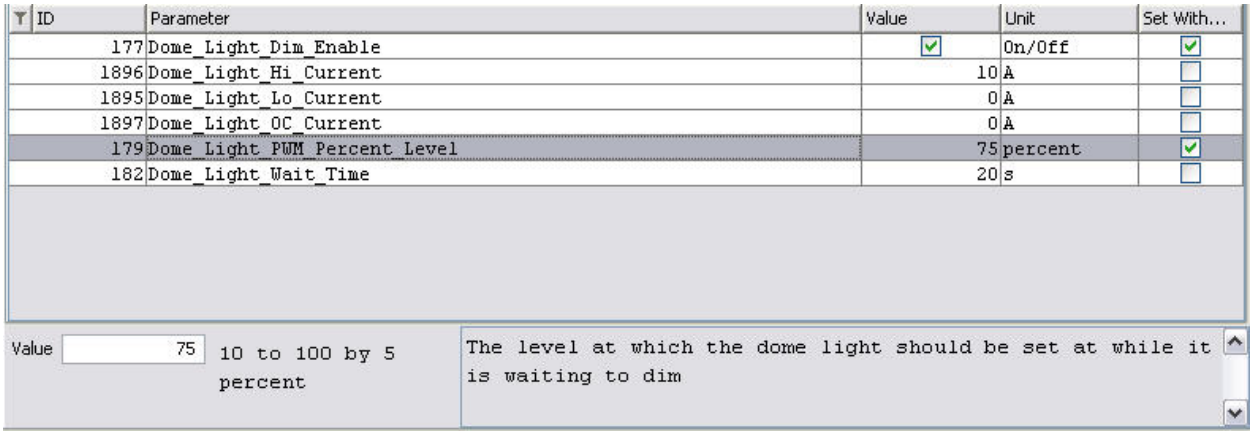
The Programmable Parameter Program Window displays the programmable parameters of the feature. It also allows the user to reset the programmable parameters for that selected feature. In this case, the user can change the percent value.



The value can also be changed in the programmable parameters listing in the Value column as well.



Now, both values show the change from 80 percent to 75 percent.



When editing programmable parameters in a **template**, the checkbox in the Set with Template column of the programmable parameters listing is automatically checked. If the Set with Template checkbox is checked when the template is applied to a VIN, the value of the programmable parameter will be changed to the new setting. If the Set with Template checkbox is not checked when the template is applied to a VIN, the value of the programmable parameter will not be changed. Care must be taken to ensure that the Set with Template checkbox is checked for all changed programmable parameter values desired prior to applying the template to a VIN.

When editing programmable parameters in a **VIN**, the changed values will automatically be programmed the next time the vehicle is programmed**. Be careful when changing programmable parameter values directly on a VIN. If the VIN has been saved, the changes are immediate and will take effect the next time the vehicle is programmed**. It is better to create a template from the original VIN and make the parameter modifications to the template. The template can be applied to the VIN and then programmed in the vehicle.

Once a change to a programmable parameter is completed the template or VIN the configuration file must be saved and then programmed into the vehicle for them to take effect.

NOTE: It is highly recommended that the vehicle configuration be printed whenever modifications are made to a VIN. These modifications include (but are not limited to): adding, deleting, moving or modifying switches, features, advanced logic or outputs/inputs on the connectors.

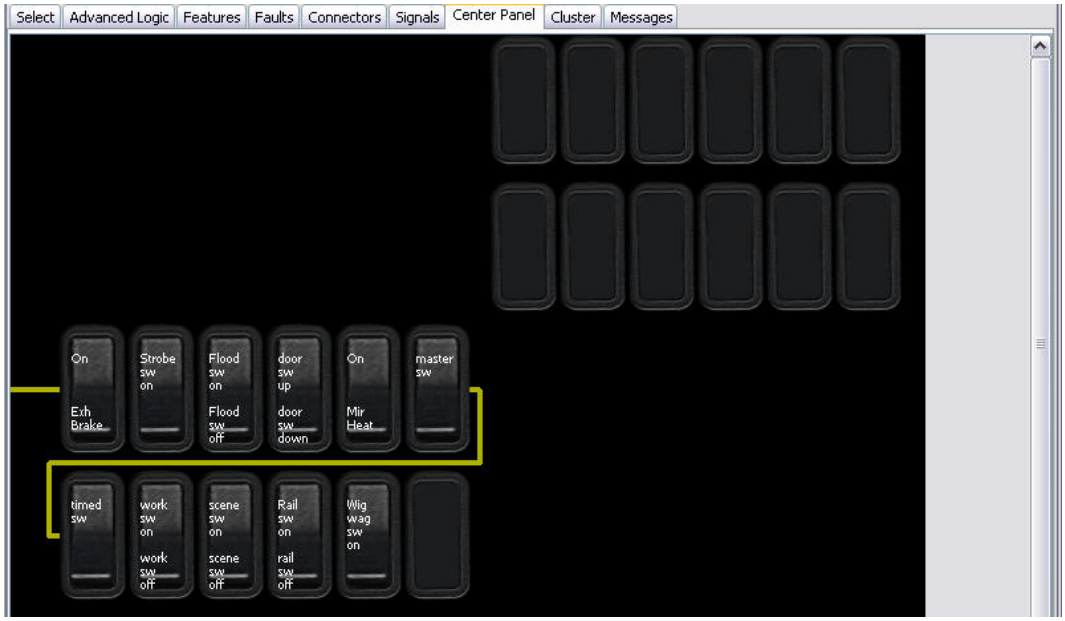
The printed vehicle configuration should be stored with the vehicle for future reference in diagnostics, repair, and modification or re-programming.
.

SECTION 13 How do I change switch, gauge and pin-out configurations?

Moving Center Panel Switch Movement

Switches, on the center panel, are generated when programmable features are added to the vehicle on the “Feature Tab”.

Switches can be moved to different locations with a click and drag action.



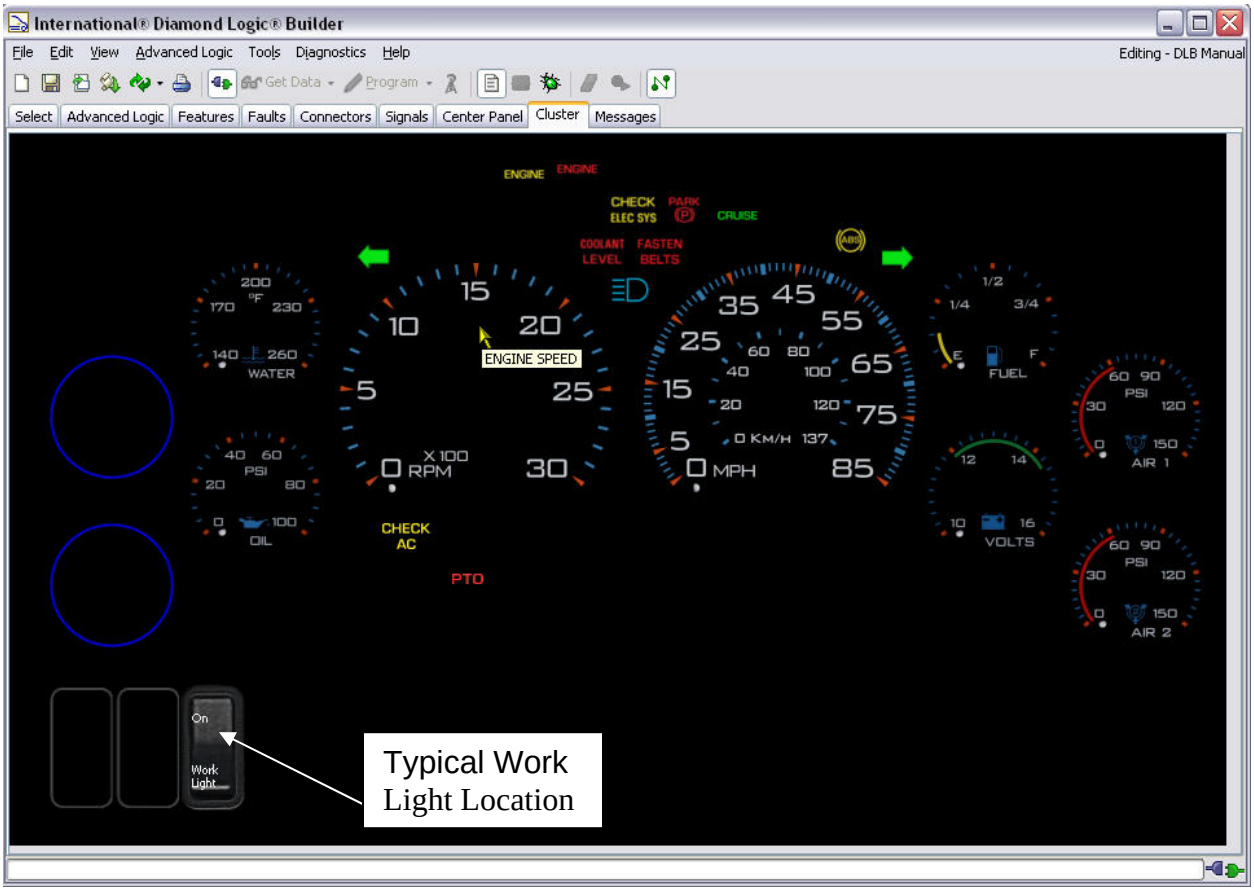
In the illustration below the “MASTER SW” was moved to the lower bank by a click and drag action. Holding the cursor over a switch or blank invokes a pop-up object description window. It now shows “Plug (No Switch)” for the end switch of the upper bank.

Moving Gauge Locations

The Cluster Tab allows the user to view the vehicle cluster gauge and warning light arrangement, as populated by the features enabled in the vehicle configuration. The gauge positions identified with a blue circle are for optional gauges. When installed, these optional gauges may be moved between these four locations. All other gauges and warning lights have a fixed position. Full view of this screen is accomplished via movement of the horizontal and vertical scroll bars.

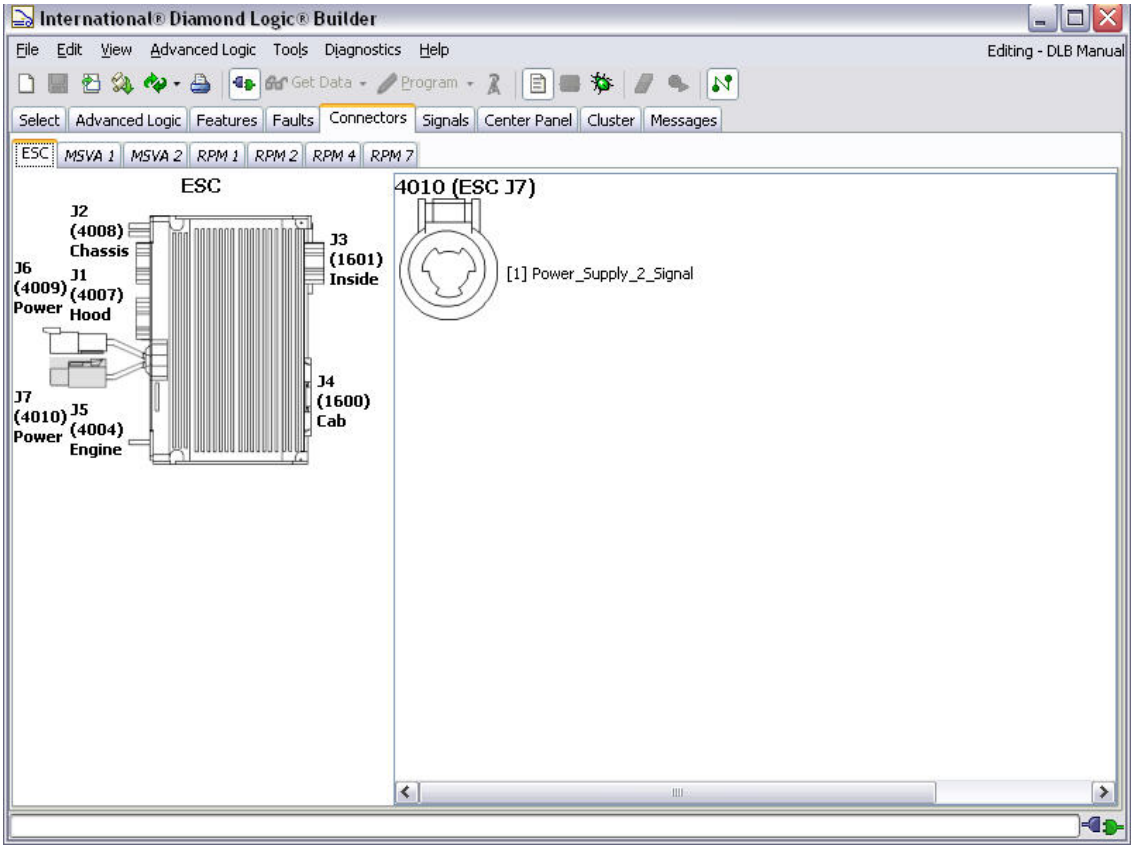
If a work light is not installed on the vehicle, a switch from the center panel view can be relocated to the typical work light switch location. To accomplish this click on the switch in the “Center Panel” view, drag it to the “Cluster” tab, wait for the “Cluster” view to open, and drag it to the typical work light switch location.

Note: Any switch in this location can be activated with the key in the off position. This provides a risk of running down the battery if the switch is left on.



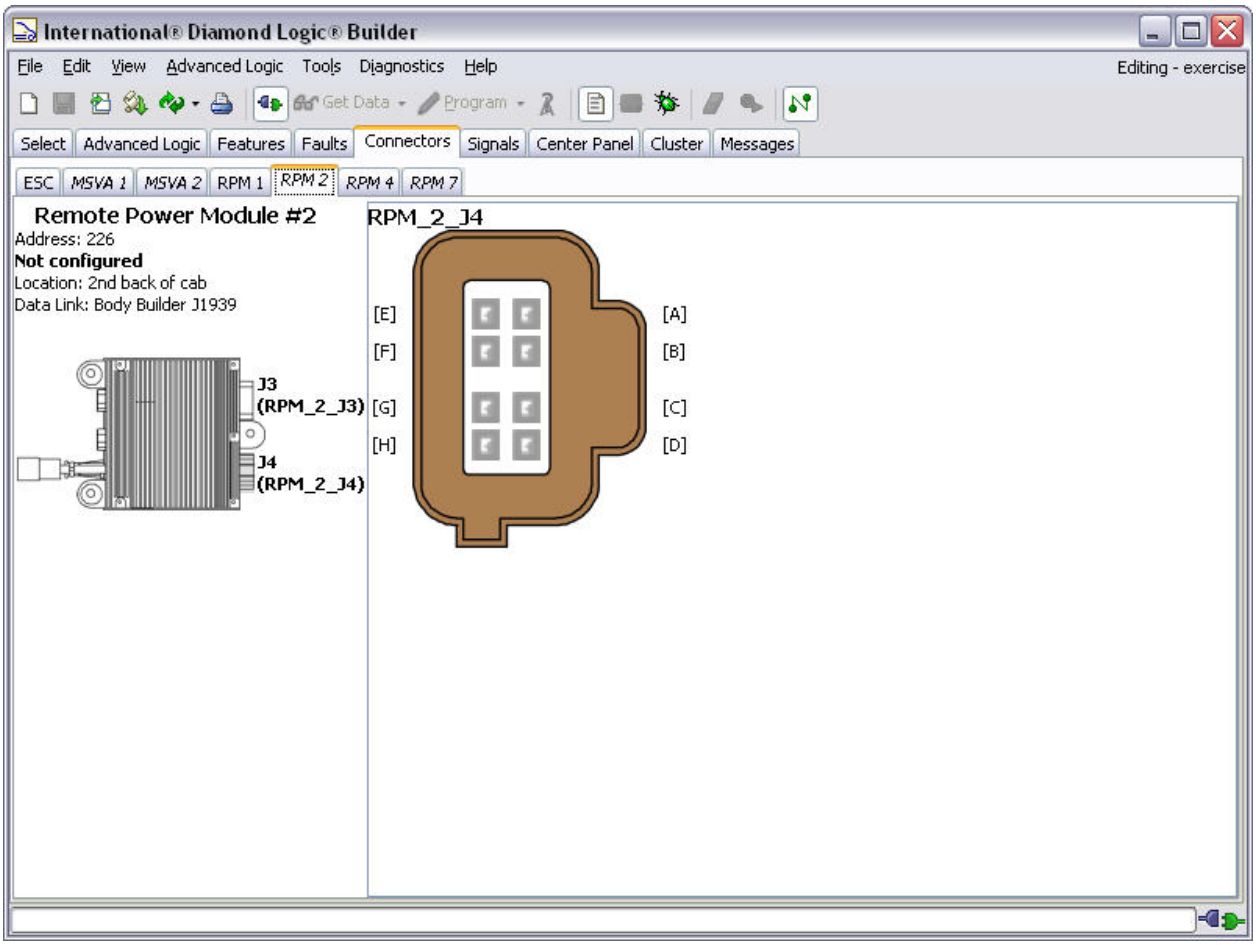
Connectors Tab

The Connectors Tab allows the user to view modules programmed for the selected vehicle. The screen displays more tabs to select a particular module. An inactive, not configured, module is signified by its Italicized title.



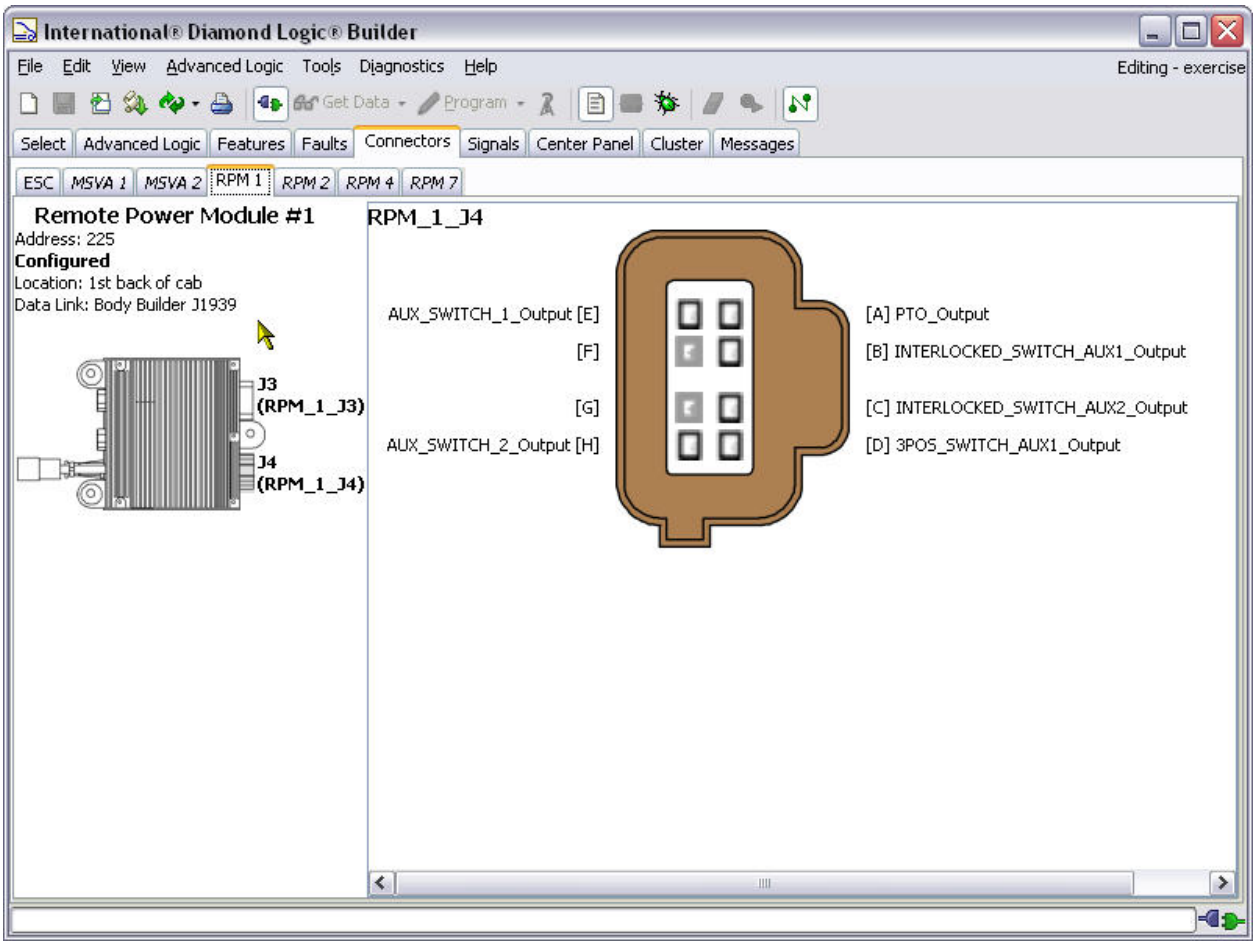
Module Not Configured

RPM 2 module's title is *italicized* indicating it is not configured. When selected, as illustrated, the screen displays the RPM module and connectors. The connector has no labels.



Configured Module

RPM 1 module's title is not italicized indicating it is configured. When selected, the screen displays the RPM module and connectors. The connector pin outs are labeled with all signals associated with that pin. The outside signal names are internal signals used by the system processor.



Selecting a Connector

When a module connector is selected, the connector in the module view changes to a dark gray color. The newly selected connector and pin out information appear in the right hand window.

Signals on an individual connector can be moved to other pins on the same connector or pins of the same connector on another RPM. DLB will not allow you to move a signal to an unauthorized location.

SECTION 14 How do I program a vehicle?

The vehicle program is made up of the following discrete software components: Base Kernel Program, a Configuration Program, consisting of Features and Logic Blocks and a Programmable Parameter file. If the kernel program on the vehicle already contains the latest version available from International, only the configuration file and programmable parameters would be loaded into the vehicle.

A vehicle should be re-programmed after at least one of the following conditions have been met:

- A newer version of the Kernel Program is available from International.
- A newer version of the Configuration Features is available from International.
- One or more features have been added or deleted from the vehicle.
- One or more programmable parameters have been modified.
- Advanced logic has been changed, added or deleted.
- An ESC is being replaced.

Only VIN files may be programmed into a vehicle. Templates must be applied to a VIN file, be saved and then the updated VIN file may be programmed into the vehicle

Connect the Vehicle to the computer using an interface cable.
Select the Computer link icon in the toolbar.

Verify the connection is established by checking that the icon in the lower right corner of the screen shows the link to the vehicle is connected.

NOTE: If you are programming a replacement ESC, a message will appear warning that the ESC Serial Number of the Selected ESC and the Detected ESC do not match.

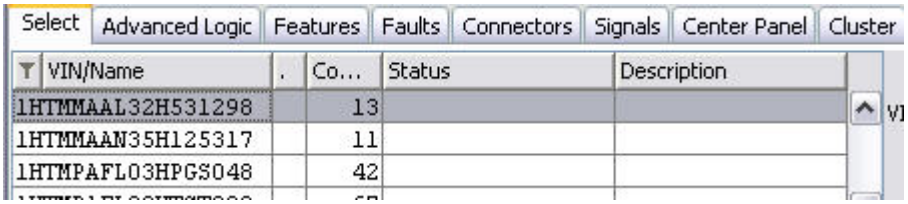
Click “OK” to allow DLB to change the Serial Number on the selected VIN. This will marry the new ESC Ser. Number to the ESC and update the VIN database in the International system.

Click the Program icon.

The system will load the VIN configuration file into the vehicle. The status bar will display the slider bar showing programming status.

NOTE: Do not interrupt while the program is loading.

Once all required sections of the VIN configuration files are loaded, the status bar will indicate that the system is resetting. The vehicle is now programmed.



Notice that the Status block is empty.

After a vehicle has been programmed the user must connect to the Internet and launch the Diamond Logic® Builder software. Connecting to the Internet will allow the Diamond Logic® Builder program to save the revised VIN configuration file in the archive at International. The Diamond Logic® Builder program will become inoperative after three days if the user does not make connection to the Internet and allow the automated upload process to take place. Likewise, the user must make connection to the Internet for an upload if more than seventy-five vehicles have been programmed in less than three days. International suggests making connection to the Internet at least once a day if the user has programmed a vehicle. The upload can be started when connected with the Send Pending History selection from the File dropdown menu.

NOTE: It is highly recommended that you Print the vehicle configuration whenever modifications are made. These modifications include (but are not limited to): adding, deleting, moving or modifying switches, features, Advanced logic or outputs/inputs on the connectors.

The printed vehicle configuration should be stored with the vehicle for future reference in diagnostics, repair, modification or re-programming.

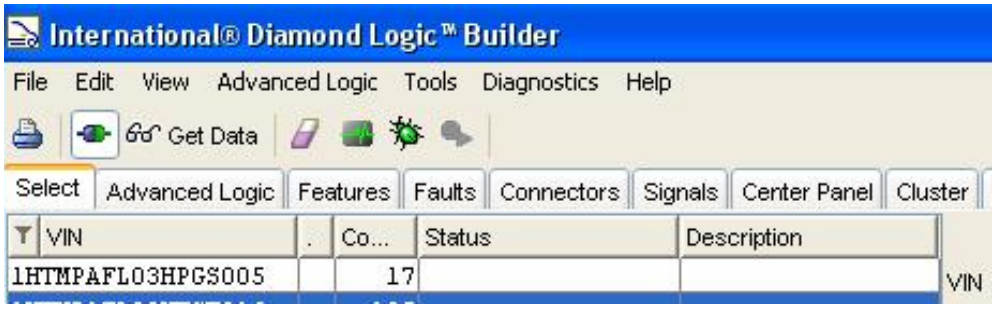
SECTION 15 How do I use the Diamond Logic® Builder software to diagnose electrical problems?

The Diamond Logic® Builder software can be used to aid in diagnosing and troubleshooting electrical/electronic system problems. Before proceeding with diagnosing and troubleshooting, there are several important steps:

- Verify the Problem – Operate the complete system and list all symptoms. Is the complaint due to misunderstood, customer selected, programmed parameters?
- Gather Information -- What happened and when? Under what conditions? When did the symptoms begin? What else occurred at the time?
- Check Diagnostic Trouble Codes – Do the logged codes correlate to the symptoms and probable causes? Were the codes logged repeatedly?
- Preliminary Checks – Perform a thorough visual inspection. Are any wires loose or corroded? Are there damaged connectors or pins? Are all components installed and installed correctly? Check to make sure the vehicle batteries are at 75% state of charge or higher. Make sure indicator lights are not simply burned out.
- Check References – Check all relevant service information including circuit diagrams and diagnostic charts.

When diagnosing a vehicle using the Diamond Logic® Builder software, the first step is to connect the system to the vehicle

Select the vehicle from the “Select” tab.

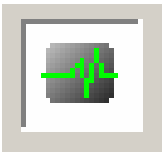


Select the Computer link icon on the toolbar.

Verify the connection is established in the lower right corner of the screen.

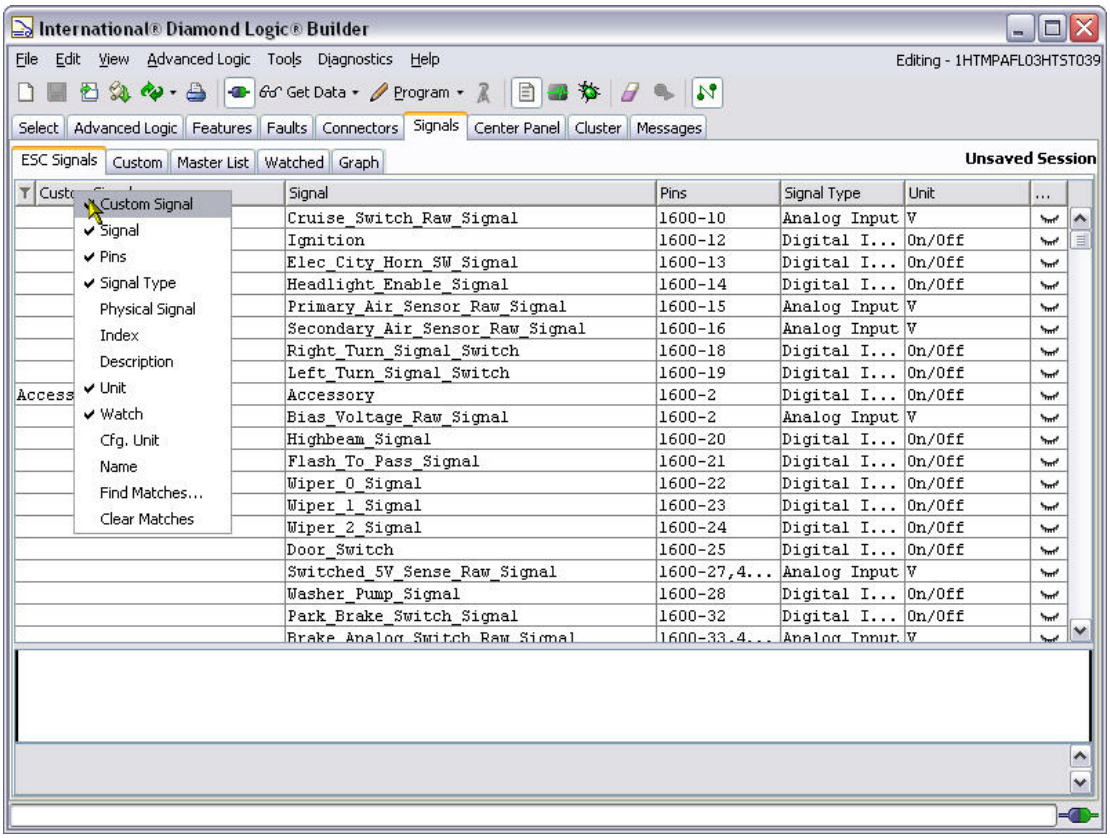
Click on the Tool Bar Diagnose icon.

The icon changes to Diagnose Selected.



Diagnosing with the Signal Screen:

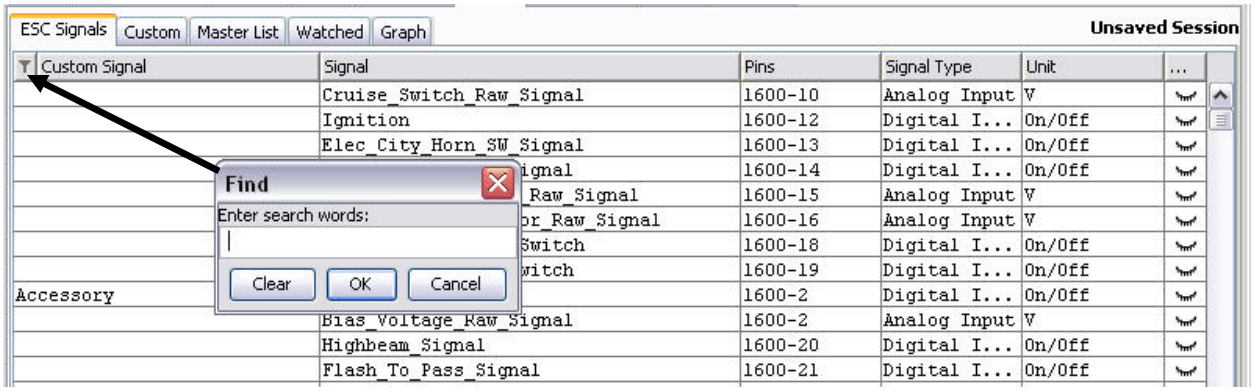
When the diagnostic mode is started, two extra data columns are added to the SIGNAL view and the Advanced Logic View. These columns are labeled WATCH and LOCK. These columns are essential in performing diagnostic troubleshooting. The WATCH Column appears as a closed eyelid. Single clicking on the closed eye-lid changes it to an open eye. The signal is now enabled for diagnosis in real time. The value of the signal may be viewed in the VALUE column. If any of these columns are not visible, right click on the symbol in the top left corner to view the possible column selections. Be sure that Custom Signal, Signal, Pins, Value, Unit, Status, Watch and Lock columns are turned on as a minimum.



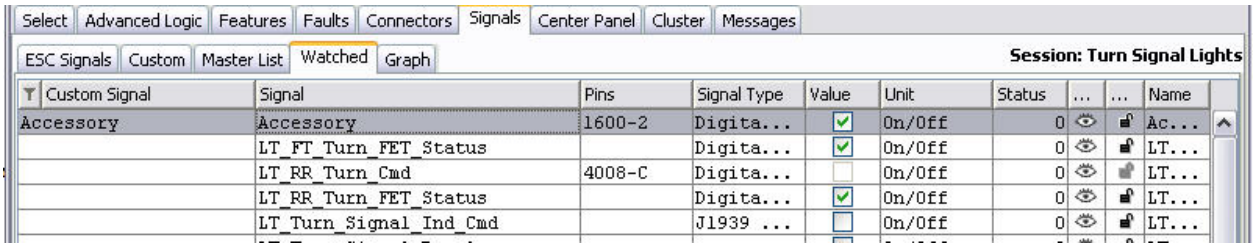
Using Signal Status while Diagnosing

Each signal in the Diamond Logic® electrical system has an associated STATUS or health. A STATUS value of zero indicates a good signal status. Any other value for status indicates that the signal health is bad and will not be used by the program logic. When troubleshooting, it is essential that the user inspect the STATUS of system signals being tested to ensure that they have a value of zero. If any of the values are greater than zero, then go to the FAULTS Tab and look for diagnostic trouble codes.

To quickly find signals that the user wishes to watch, use the search utility that is found in the upper left corner of the Signal screen or the My Variables screen in Advanced Logic.



By observing the data in the VALUE column the user can monitor the value of selected signals. ON/OFF signals are represented by a check box where the signal is ON when the box is checked. Also observe the UNIT column to see the unit of measure associated with the signal value.



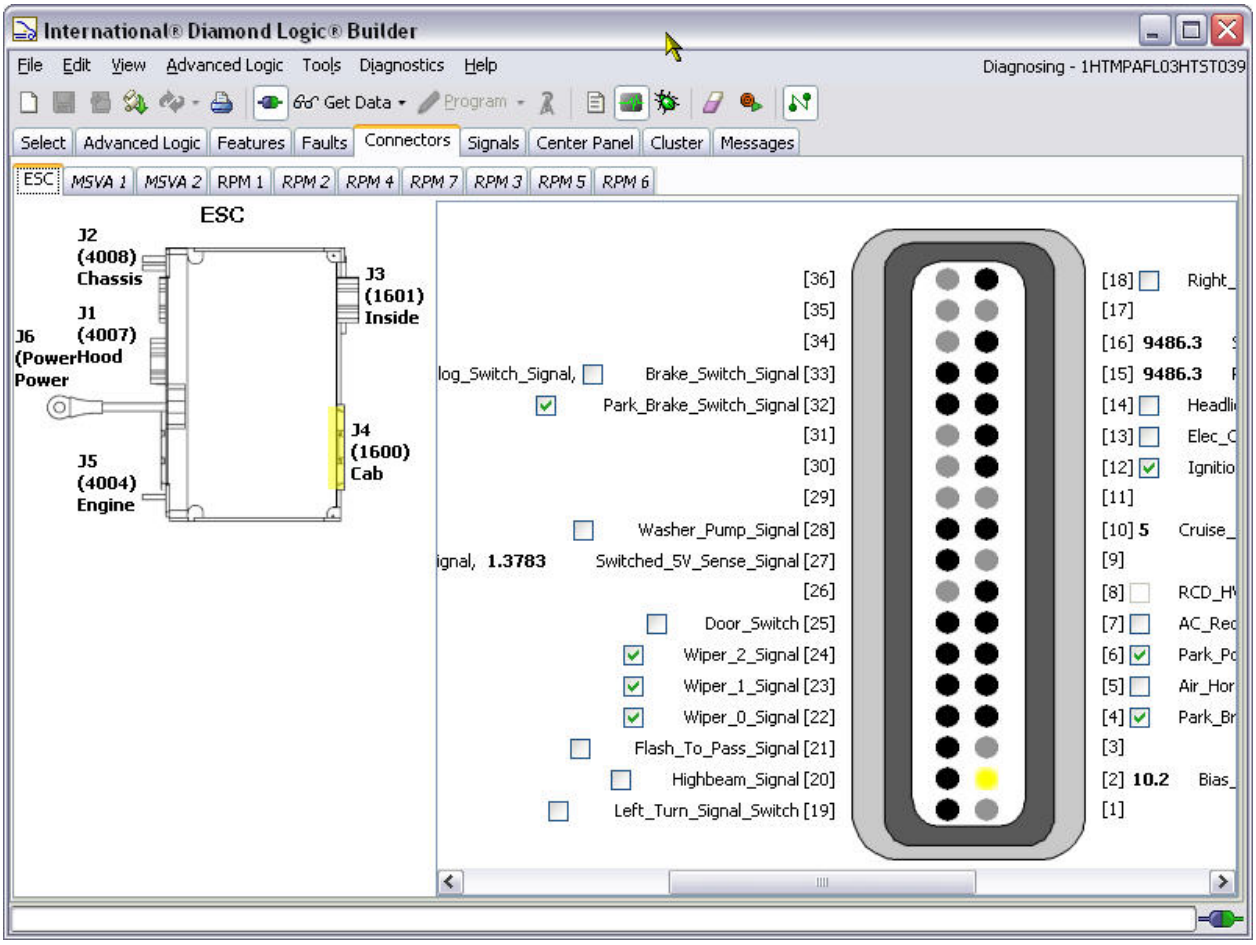
Forcing Signal Values

In addition to monitoring signal values the user can also force signals to a predetermined value. For example, the ACCESSORY signal can be forced ON or OFF just by checking or un-checking the box in the value column on the ACCESSORY line. The accessory voltage is not actually being forced ON or OFF, but from an ESC programming logic standpoint it is. Therefore, all the features or Advanced ladder logic that use the ACCESSORY signal will respond according to the ON/OFF state of ACCESSORY. **Please note that once a signal is forced to a new value the LOCK**

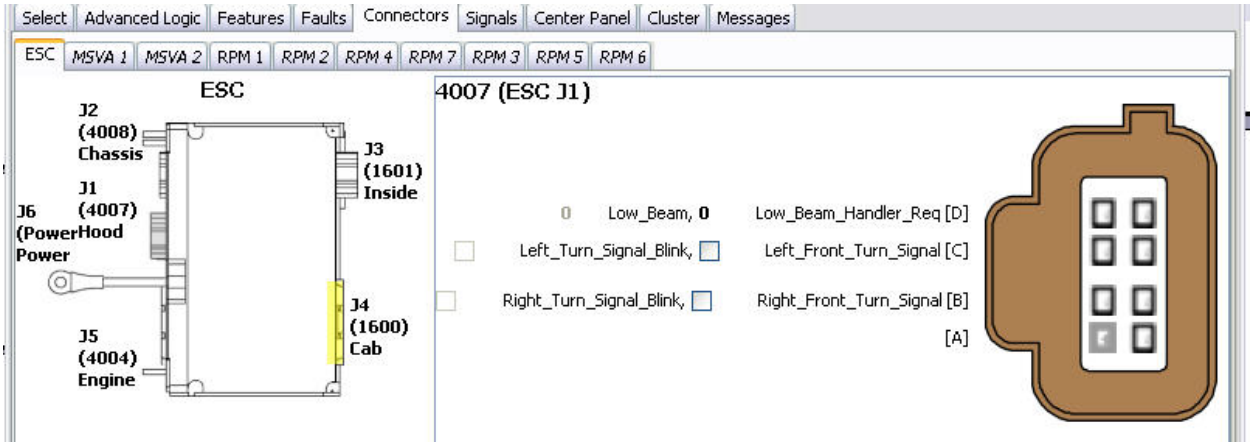
Icon in the lock column will show as locked. Once locked, changes by external inputs such as switches or sensors will be ignored. In order to restore the signal to an unlocked condition, place the cursor over the LOCK Icon and left click a single click, now the signal will respond to normal system inputs and outputs.

Diagnosing with the Connector View

Signal values that are present on physical pins of various electrical modules can be observed by selecting the Connector view. Note that there is a tab for each module. Use the connector view to help isolate the problem. The connector views provide the ability to monitor system values without the use of break out boxes. Scaled voltages, temperatures and pressures are presented for analog voltages and check boxes are provided for ON/OFF values.

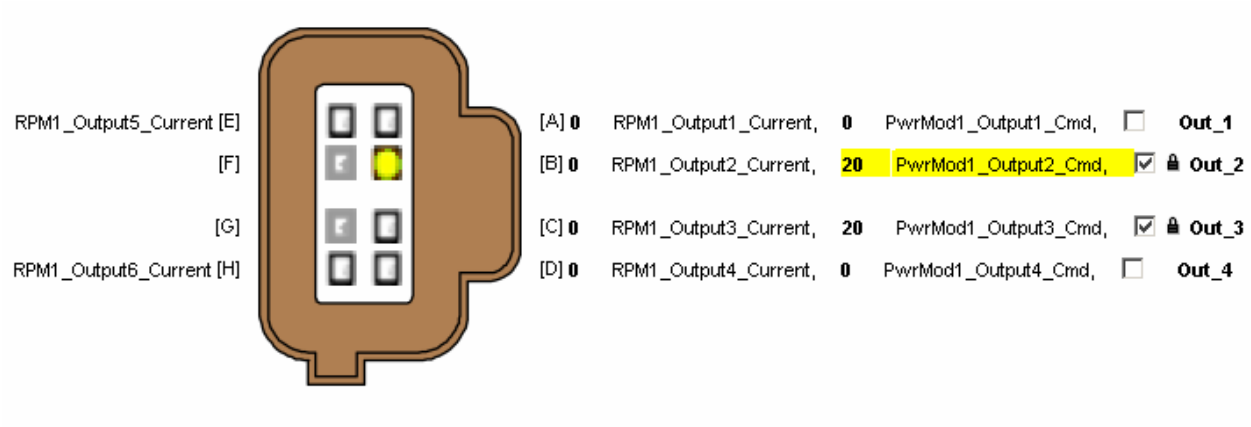


In the connector view, you can observe the state of each input and output from the ESC and each RPM and MSVA. You can also override each input and output. A specific module is selected by clicking on the Module Tab. This brings up a graphical picture of the module and connectors on the left. Click on a connector and it becomes shaded in gray and is displayed on the right.



RPM Connector View

Below is the output connector for RPM 1. An output is selected by clicking on the name; notice how "INTERLOCKED_SWITCH_AUX1_Output" is highlighted in yellow. When an output is selected by clicking on the name the pin in the connector drawing will also highlight. Selecting an output in this way will also automatically select this output in the signals tab. This is a very helpful feature if you are not sure of the feature code that controls that particular RPM output. To turn off the yellow highlight hold down the Ctrl key while selecting an output



RPM Output Connector View

On the output connector, you will notice that each contact has several things associated with it. The following explains what each item:
[B] – Connector cavity pin numbers are in brackets.
PwrMod1_Output2_Cmd – This is the name assigned by the feature that is using this output.
The 20 before the feature assigned name shows that this output is set to virtually fuse at 20 Amps, the default is 20 Amps.

RPM1_Output2_Current – This shows the current draw on the RPM output. The 0 next to the pin number or letter ([B]) represents the current drawn by the load on output 2.

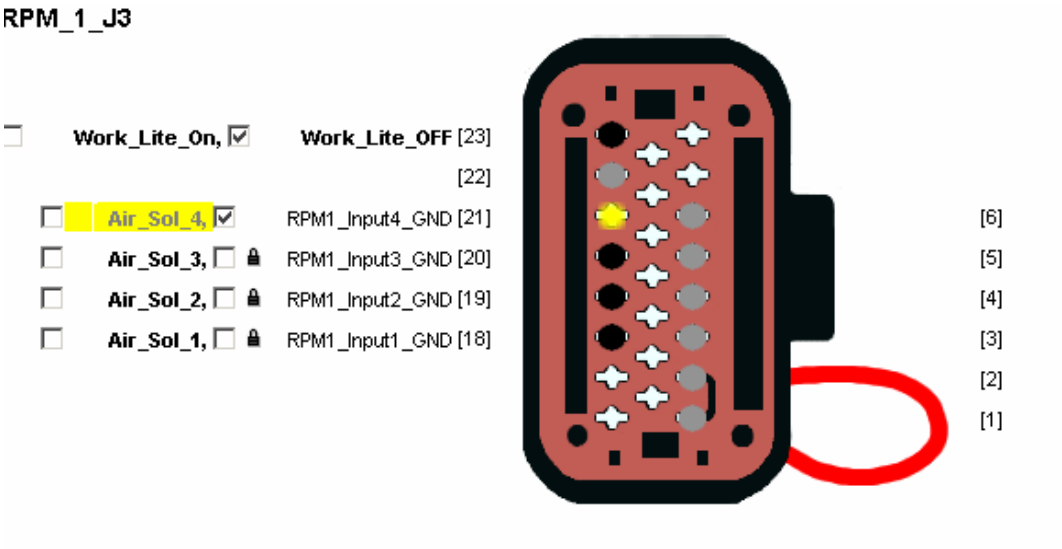
NOTE: A bold output name would indicate that a custom name has been assigned to this signal with advanced logic.

A check box is used to turn the output ON and OFF. The lock icon, like that for pin B, is used to lock and unlock the output ON or OFF. When locked no other signal can drive that output.

NOTE: If you are having trouble with outputs not turning ON or OFF as expected check to make sure those outputs are unlocked.

Notice how the name “PwrMod1_Output2_Cmd” is highlighted in yellow when selected. If an output is selected by clicking on the name, the pin in the connector graphic will also highlight. When an output is selected this way it will also automatically be selected in the signals tab view. This can be very helpful if you are not sure what feature code controls a particular RPM output. Selecting an output while holding the Ctrl key down will unselect that output and turn off the yellow highlight.

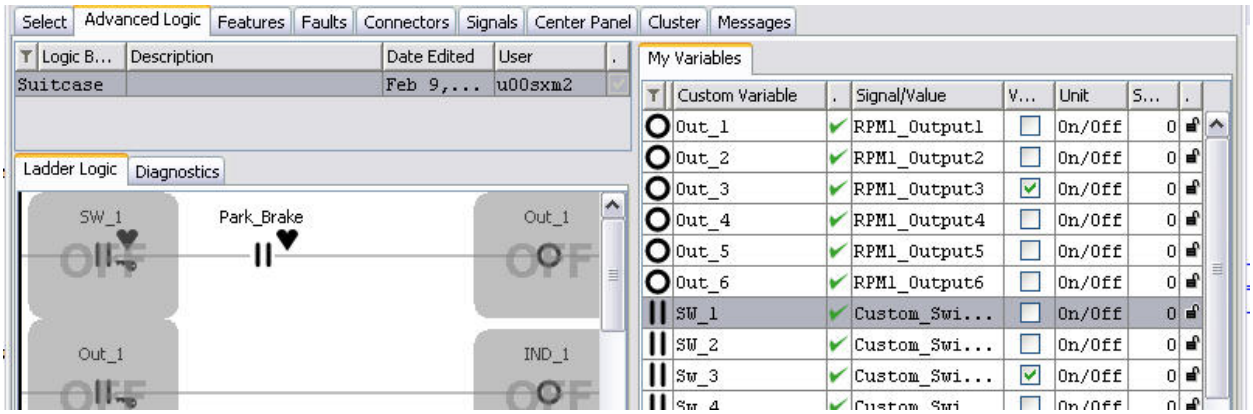
Input connectors, like RPM_1_J3 shown below, are represented much the same as output connectors. However, names are handled a little differently. Each pin of an input connector can be programmed in the ESC to respond to either a 12v signal or a ground signal. The ground signal is always listed closest to the connector image, in this case “Air_Sol_4, ”is the ground. The lock works the same as it did on the output connector. The input connector will also show the addressing; note the red jumper wire between pins 1 and 2. Jumper wires on the input connector determine how an RPM is addressed. Addressing is extremely important. RPM input connectors should not be moved around. Doing so will move all inputs and outputs programmed to that particular RPM

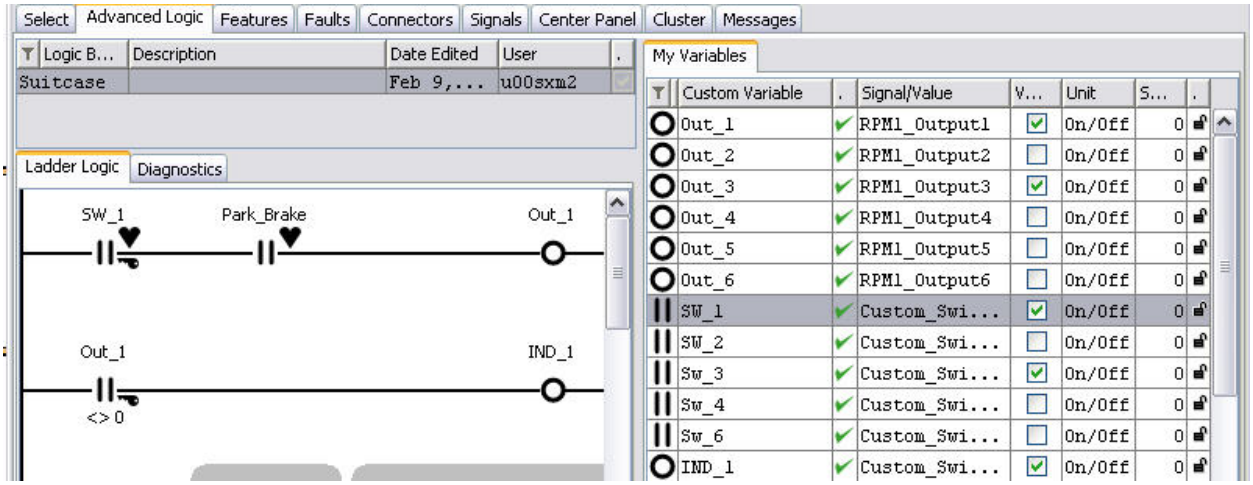


RPM Input Connector View

Diagnostics in the ladder view

Diagnostics in the ladder view is simple and straightforward. Connect to the truck then once in diagnostics mode select the advanced logic tab. Gray OFF or brown question mark shadow blocks will be seen over most items. Brown shadow blocks indicate items where the present state cannot be determined. On the right of the screen, you will see the tabs that contain all the signals that can be used in advanced logic. At this point, you can observe actual signals received from the truck. For example: while hooked up to the vehicle, in diagnostic mode and on the advanced tab, you can observe the actions on the vehicle. The first figure shows an advanced block with a switch in the first rung of the ladder logic. There are two ways of testing to ensure the vehicle is working properly. The first is to actually activate the switch in the vehicle and watch for the outcome on the screen. The second is to override the switch and click the checkbox in the value column on the right of the screen. Clicking the checkbox is the way to test out the advanced logic in the simulate mode. This tells the ESC to ignore the switch state and activate the circuit regardless of switch location. The second figure shows the same screen with the switch in the up position. Notice on the left side of the screen, the graphic display shows that the switch and corresponding outputs are now in the on position. The right side of the screen now has checkmarks in the items that are now set to ON. Returning the switch to the OFF position will once again turn OFF the switch and the switch outputs.



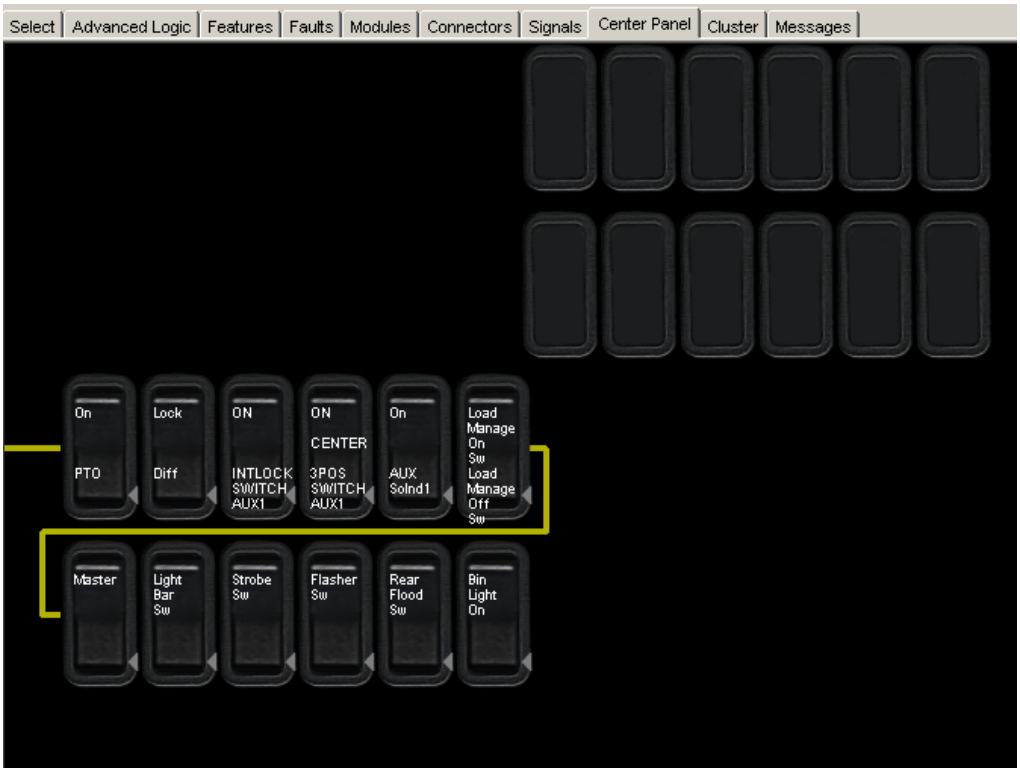


Ladder View Example

Each of these techniques has value. For items such as switches and the park brake, it is very easy to either turn them ON or OFF. However, for items such as intermediate variables created in the ladder logic and RPM input signals, the value column is an excellent option. This overrides the vehicle signal. By observing the reaction of the logic rung, you can diagnose the vehicle. If all the items on the left side of the logic block are properly set, the value on the right should be either ON or OFF. If the contact, light or output indicator is on in the diagnostic screen then the output should also be on, if not check for a fault code in the Faults Tab view.

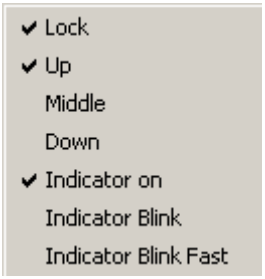
Diagnostics in the center panel view

When you select the center panel view in the diagnostic mode, you will see images of the switches, a yellow line representing the multiplex data link tying the switch packs together and arrows indicating the current switch setting. When the state of the actual switch is changed the arrows and images will change and indicate the new state. Also Diamond Logic® Builder can override switches. When Diamond Logic® Builder is used to cycle switches the arrows and images will change indicating the new state plus the padlock icon will appear indicating a locked condition.



Switch Tab Screen

Override the switch by clicking on the switch, or by right clicking the mouse and selecting from the following list. Clicking on the top of the switch will activate that switch output and the arrow will move to the up position. This overrides the switch and allows you to determine if there is a switch problem. The padlock, which appears on a switch, allows you to lock that signal in any of the switches valid positions. Click on the lock to remove it



Switch right-click screen

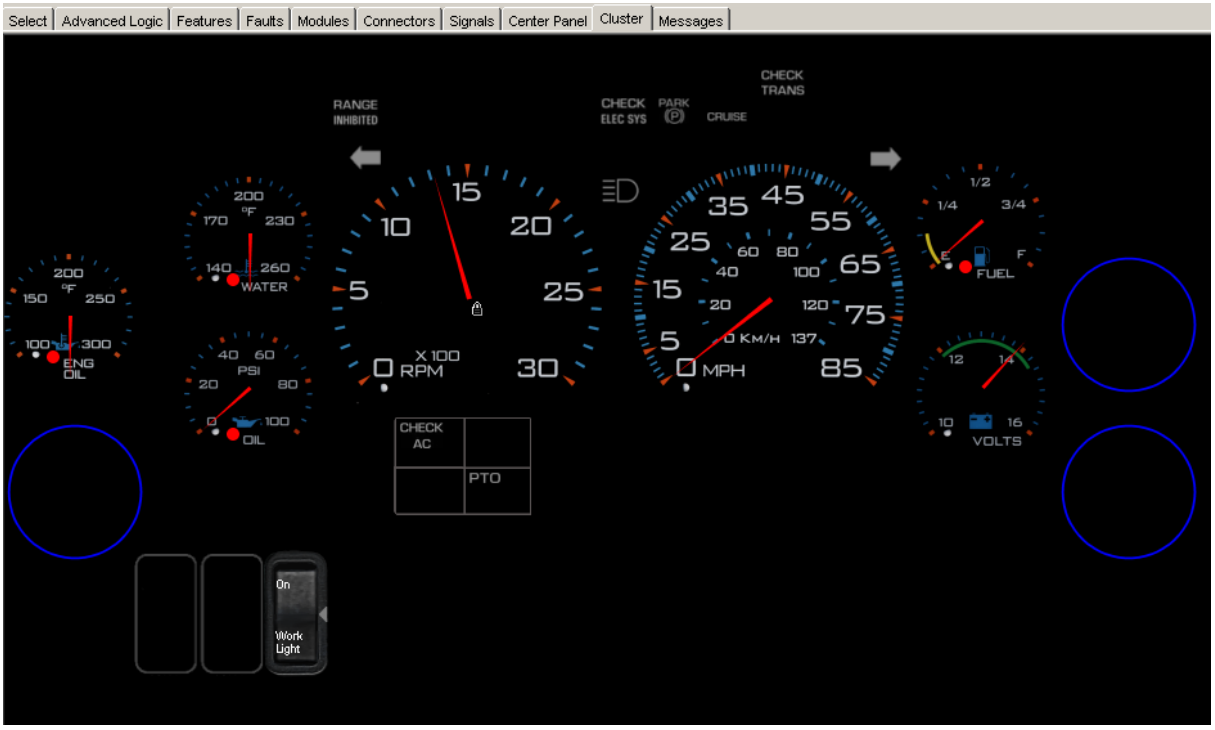
Switch shown in the on position with lock

When diagnosing switches, it is important to remember a few facts. The switch rocker is nothing more than a plunger. When a switch is pushed, it pushes one of two plungers in and contacts a micro switch in the switch pack. Each switch location has two micro switches. The switch can be in 1 of 3 valid states; micro switch 1 is depressed, micro switch 2 is depressed or neither micro switch is depressed. When diagnosing a switch by checking the box in the signals, features, or advanced logic tabs (while in either diagnostic or simulate mode) you must select the switch position you want, i.e. switch up position. You must also make sure that the switch middle and switch down check boxes are not selected. If you have more than one switch state selected in the advanced logic or signal view, your switch will show yellow in the center panel view. This tells you that you have put the switch in an illegal state. Turn OFF or unlock the individual switch signals in the advanced logic view of signals view before you continue with the diagnostics or simulation with the Center Panel View.

Diagnostics in the gauge cluster view

When the gauge cluster view is selected in diagnostic mode the movement of the diagnostic mode gauges, mirror the movements of the actual gauges. Therefore, for example, if the fuel gauge does not appear to be working you can check the gauge cluster view and see if the signal is driving the diagnostic mode gauge. If the gauge in the diagnostic view is working but the actual gauge is not, follow the International troubleshooting guide to complete the diagnosis. By placing the cursor on the outer ring of a gauge and clicking the left mouse button the user can override the actual gauge signal.

This forces the gauge to the reading indicated by the cursor location. In the illustration below the Tachometer has been clicked at the 1300RPM mark.



Gauge Cluster View

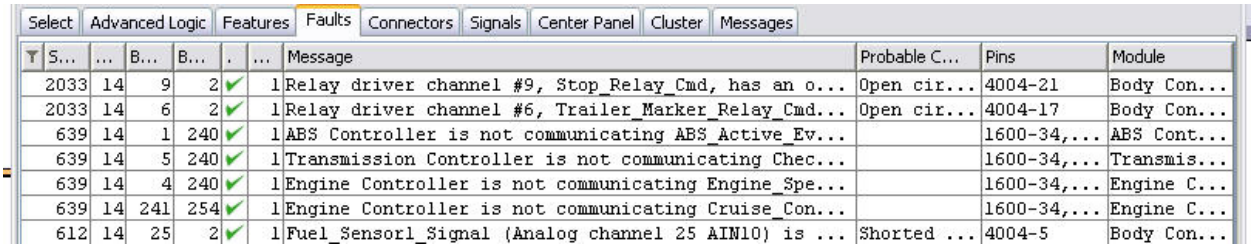
Also double clicking in an area around the center of a gauge will bring up text box in which a specific gauge set value can be entered. The gauge should follow the diagnostic gauge setting. If the gauge does not follow the diagnostic gauge, then follow the International troubleshooting guide.

Gauge cluster after double clicking on the temperature gauge

When observing the gauges in diagnostic mode, a gauge may momentarily dip to ‘0’. This occurs because of the high update rate required by some gauges and an update may occasionally be missed. The speedometer and the tachometer are most susceptible to this anomaly because of their high update requirements. This is a normal condition and is not an indication of a defective gauge.

Diagnosing Fault Codes

The ESC and the Gauge Cluster generate diagnostic fault codes. Erasing fault codes will clear all codes stored in the gauge cluster. If fault codes are still active, they will re-populate the FAULT screen. The user can decode diagnostic fault codes directly by selecting the Faults screen. See the attached example:

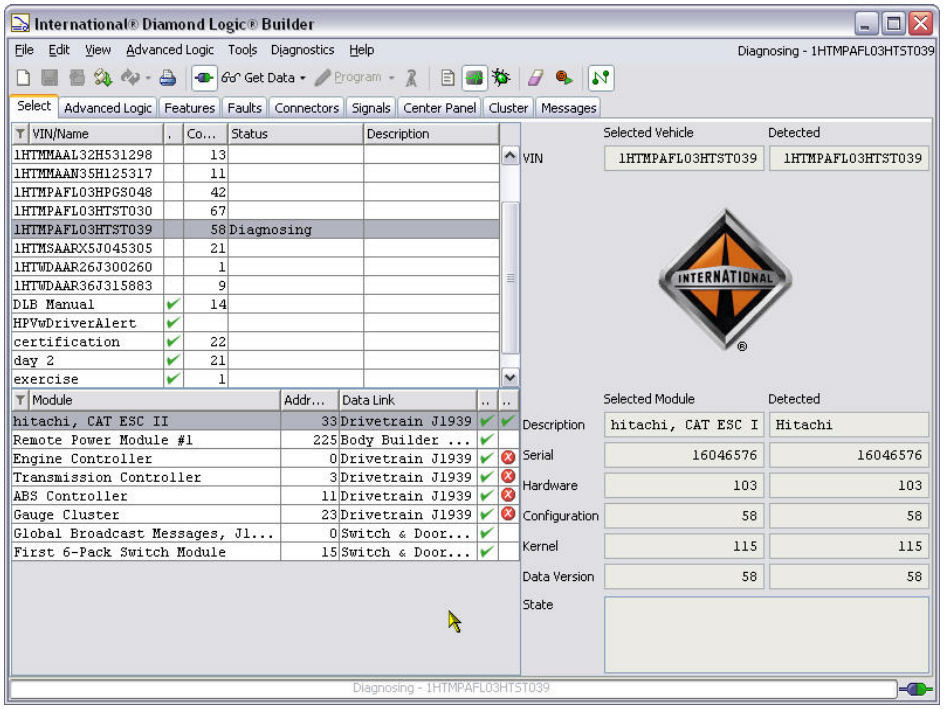


S...	...	B...	B...	.	...	Message	Probable C...	Pins	Module
2033	14	9	2	✔	1	Relay driver channel #9, Stop_Relay_Cmd, has an o...	Open cir...	4004-21	Body Con...
2033	14	6	2	✔	1	Relay driver channel #6, Trailer_Marker_Relay_Cmd...	Open cir...	4004-17	Body Con...
639	14	1	240	✔	1	ABS Controller is not communicating ABS_Active_Ev...		1600-34,...	ABS Cont...
639	14	5	240	✔	1	Transmission Controller is not communicating Chec...		1600-34,...	Transmis...
639	14	4	240	✔	1	Engine Controller is not communicating Engine_Spe...		1600-34,...	Engine C...
639	14	241	254	✔	1	Engine Controller is not communicating Cruise_Con...		1600-34,...	Engine C...
612	14	25	2	✔	1	Fuel_Sensor1_Signal (Analog channel 25 AIN10) is ...	Shorted ...	4004-5	Body Con...

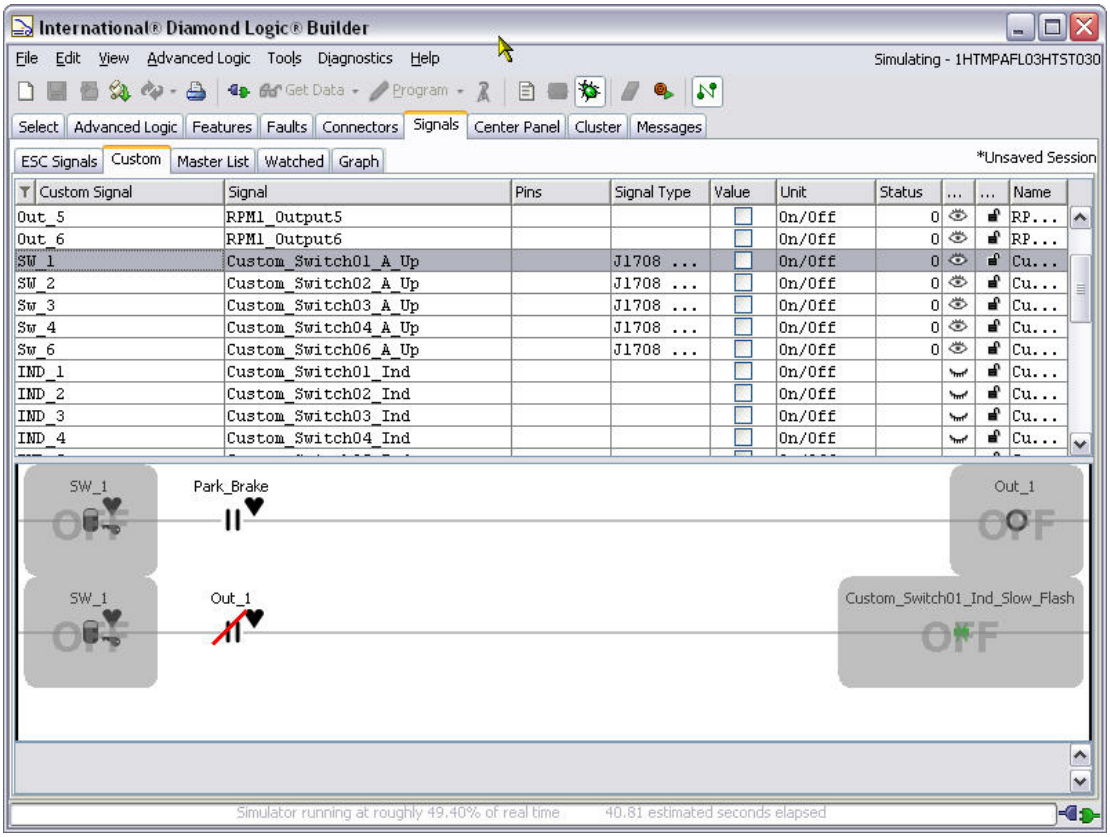
The fault screen provides a very comprehensive description of the diagnostic fault including text description, probable cause, connector pin associated with the fault and the module associated with the fault. Note these faults are only associated with the ESC and other body control modules. Major systems such as engine, transmission and ABS have individual diagnostic programs. Use the power train diagnostic programs to troubleshoot those systems.

Module Detection

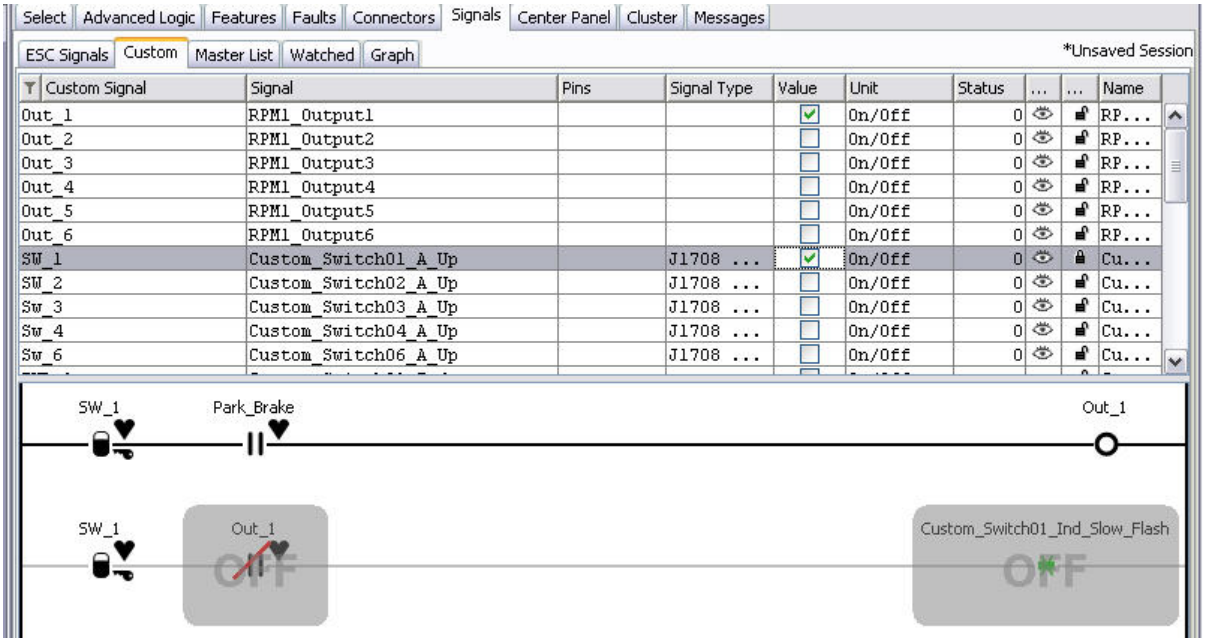
The Diamond Logic® Builder program has a module detection function. The purpose of this feature is to provide a quick look at which electrical system modules are communicating on a data link. Select the SELECT Tab. The Modules area shows all modules that are expected to be present in the configuration of the vehicle. Currently the system accurately detects modules that are connected to the power train J1939 data link, when the ignition key is in the run position.



Another diagnostic check in the Signals Tab is to look at Custom Signals and Ladder Logic. In this example, look at Out_1 and lSW_1.



In the first Ladder Logic rung there is SW_1 and a Park_brake; SW_1 is off as indicated in the grayed area. In the signal listing, clicking the SW_1 Value check box turns on the switch.



INFORMATION

1. Diagnostic fault codes will only be viewable on the FAULT screen while the ignition key is in the run position. The engine does not need to be running to view the ESC codes.

2. The Diamond Logic® Builder program will not show fault codes from the engine, transmission or Anti-Lock Brake systems. Use the diagnostic program provided by the power train component supplier to diagnose those systems.

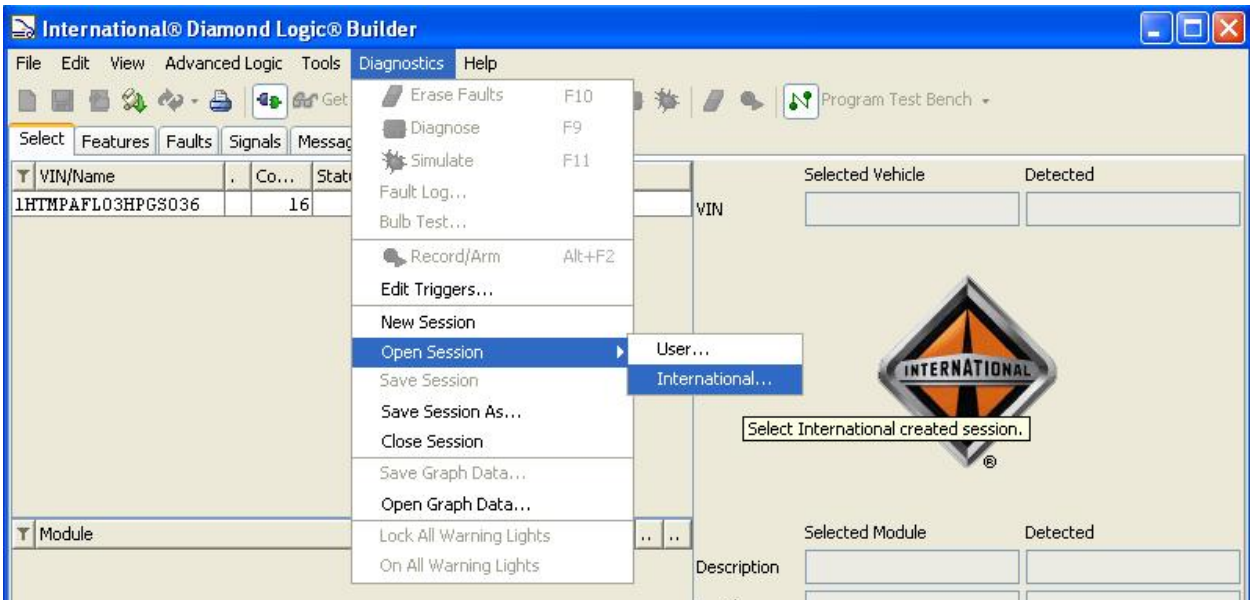
3. When diagnosing the gauge cluster with the Diamond Logic® Builder program the pointers may not be stable. The pointers may be steered to zero intermittently. This is normal. Do not replace the gauge cluster due to this anomaly. It is important that the user can steer the gauge to a nominal value and that that the pointer does not stick or jump in the process.

SECTION 16 How do I use Sessions and Triggers?

The session feature provides canned sessions built by International and allows a user to save a custom group of signal selections to an electronic file that can be used in the future. This allows the user to quickly select a set of signals to use during diagnostics. Sessions can only be used in diagnostics mode. Selected signals and trigger settings are also saved in the session.

Opening a Session

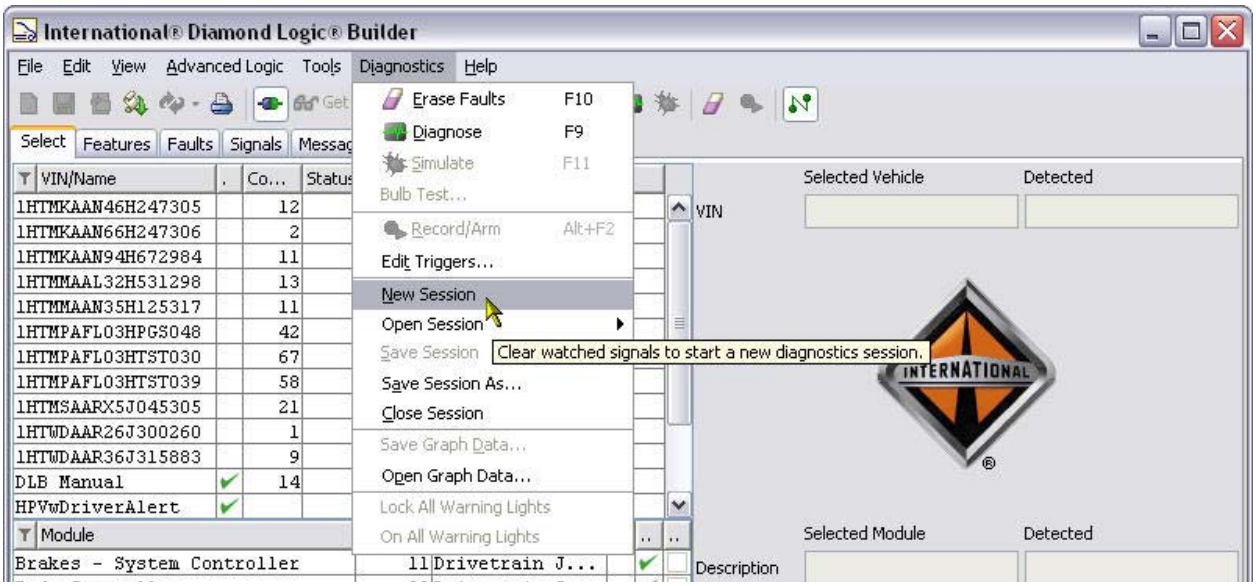
To open a Session, click on the Diagnostics pull-down menu and click Open Session



Selecting “International…” will open a list of Sessions created by international. Selecting “User…” will open a window where the user can select a directory and file name for a session previously saved by the user.
After a session has been selected, select the SIGNAL Tab screen view. Select the ESC Signals Sub-Tab to view all signals in the vehicle configuration that are present in International® designed features on the vehicle. Open the Watched Sub-Menu item to see a listing of signals used in the selected session.

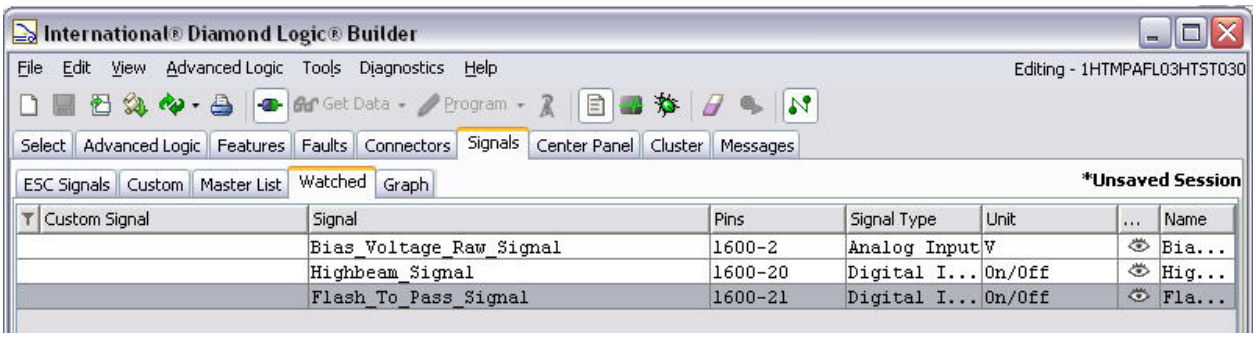
Creating a Session

To create a Session, click on the Diagnostics pull-down menu and click New Session



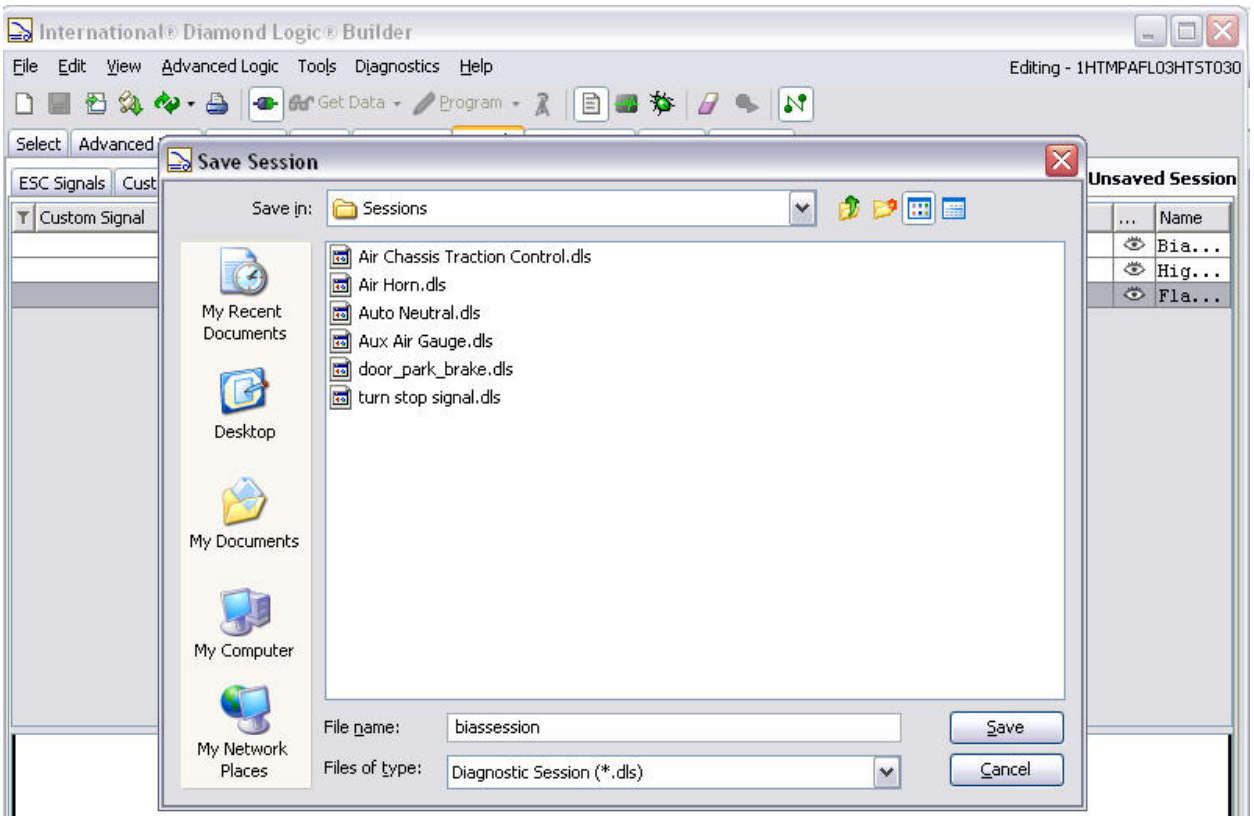
Select the SIGNAL Tab screen view. Select the ESC Signals Sub-Tab to view all signals in the vehicle configuration that are present in International® designed features on the vehicle. Select the CUSTOM Tab to view all ladder logic signals that have been created in Advanced Logic. Select the Master List to see a total list of all possible signals in the Diamond Logic® electrical system. Note that the vehicle being diagnosed will only have a small subset of the Master List of signals. Use the SEARCH utility to find the signals, in the chosen sub-tab, that the user wishes to graph or record. Enable the signals to be watched by double clicking on the eye-lid Icon next to the desired signal.

When the eye-lid changes to an open eye, the signal is selected.
Open the Watched Sub-Menu item to see a listing of selected signals. For this example Bias_Voltage_Raw_Signal, Highbeam_Signal and Flash_To_Pass_Signal have been selected to watch.



From the Diagnostics pull-down menu, select Save Session and give the Session a name that is meaningful to you. For our example, use Bias Session. When Save is

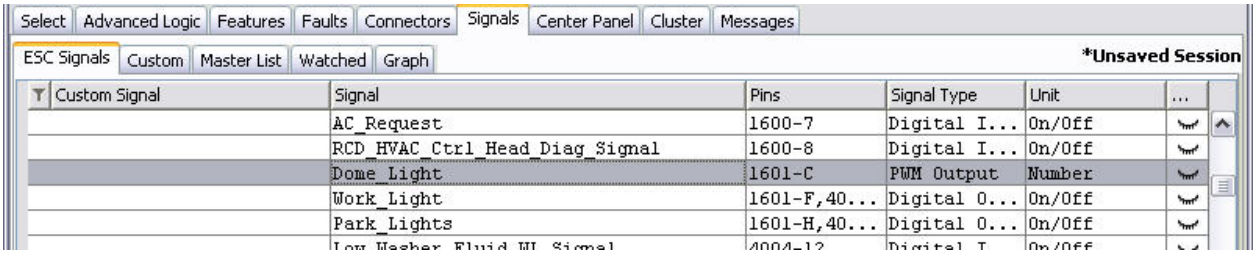
clicked, the three signals chosen to watch will be available again as a computer file called BiasSession.dls. This file can be used again and will open those same three signals to watch. In addition, this file can be sent by E-mail.



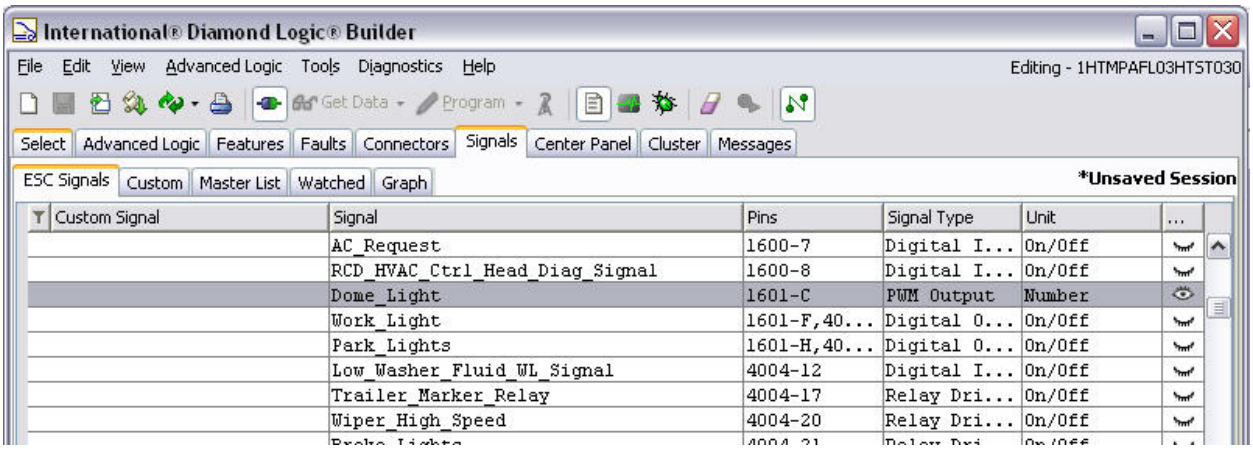
Selecting Signals for Recording and Graphing

In this example, we will watch two switches set up in custom logic and the associated indicators for the switches.

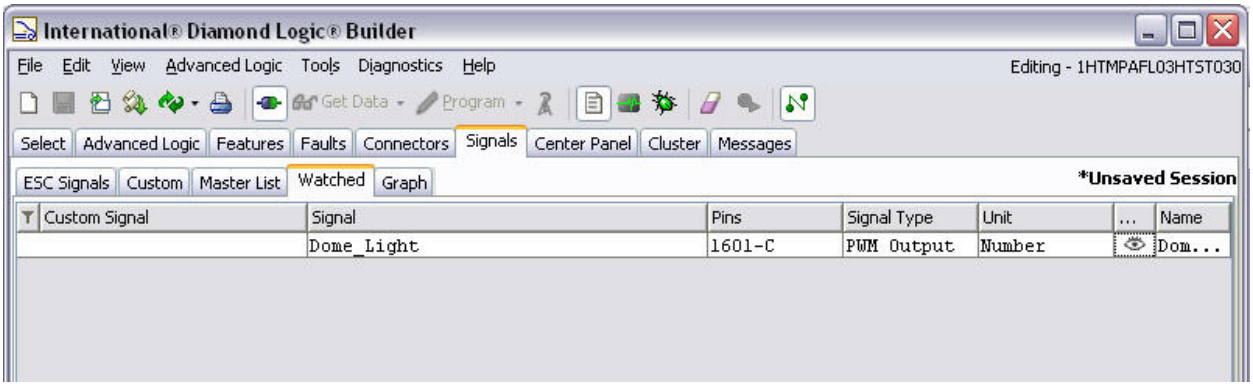
From the Signals Tab, the Custom Signals heading bar has been clicked. Select the signals to be watched by clicking the not watched icon ( ) for the signal.



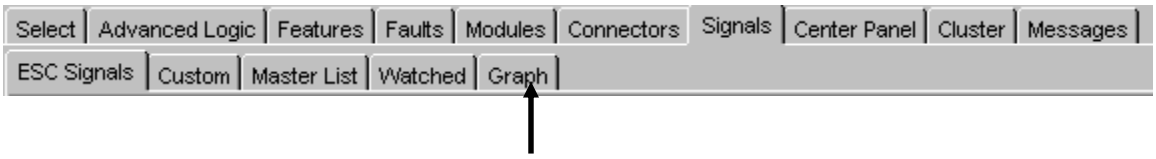
The watch symbol will change to the watched icon ( ).



Click the Watched button to verify the selections made.

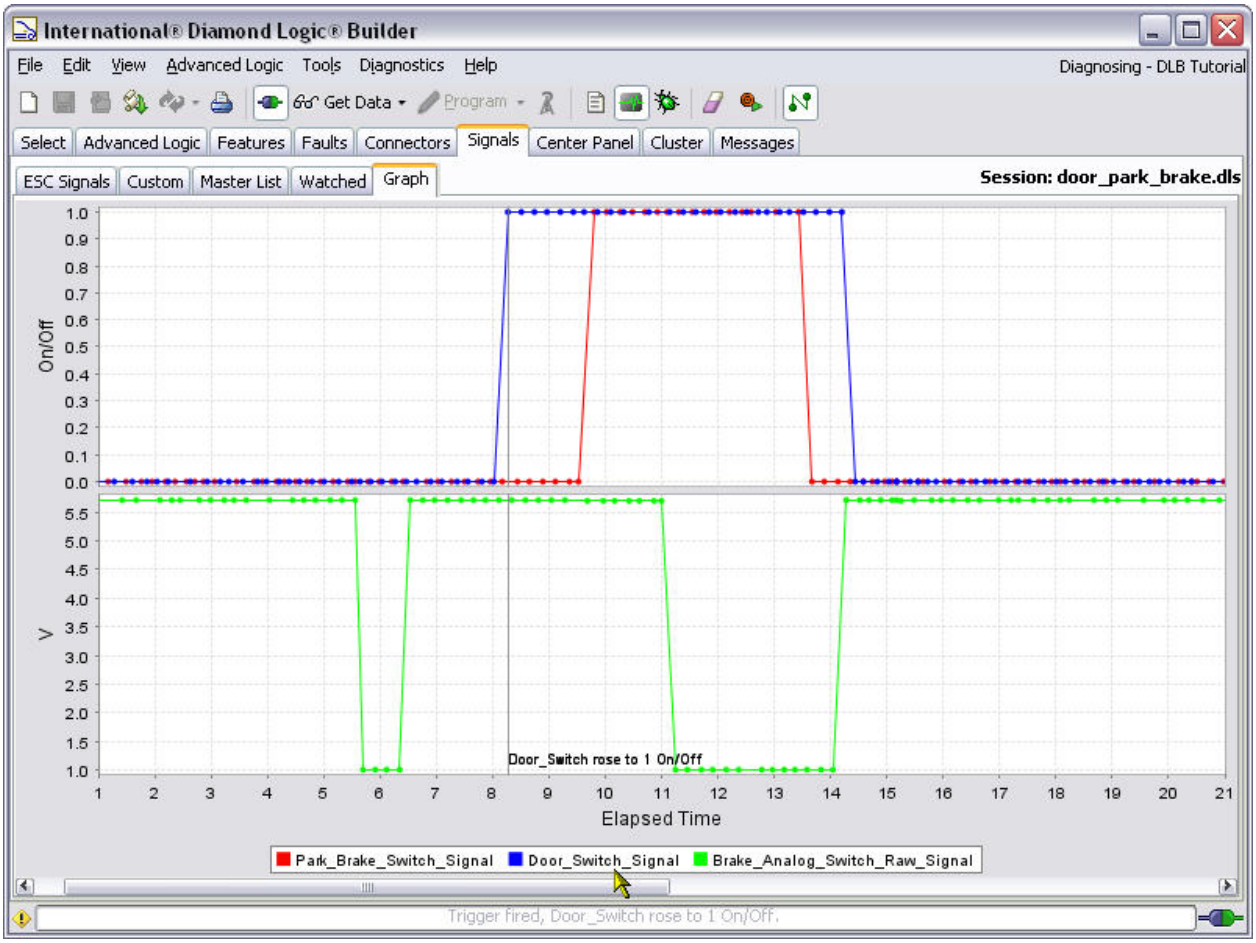


Click on Graph



Click on the Recorder icon on the Tool Bar ( ).

The graph below shows the results of turning ON Switch 1 and Switch 2 then turning OFF Switch 2 and Switch 1.



There is a single icon ( ) that starts and stops the recording of data to the graph and arms the triggers. If no triggers have been set, recording to the graph continues until the user stops it by pressing the button again. If there are triggers set, the user can still manually stop the recording by pressing the button.
Recording and Graphing Views:

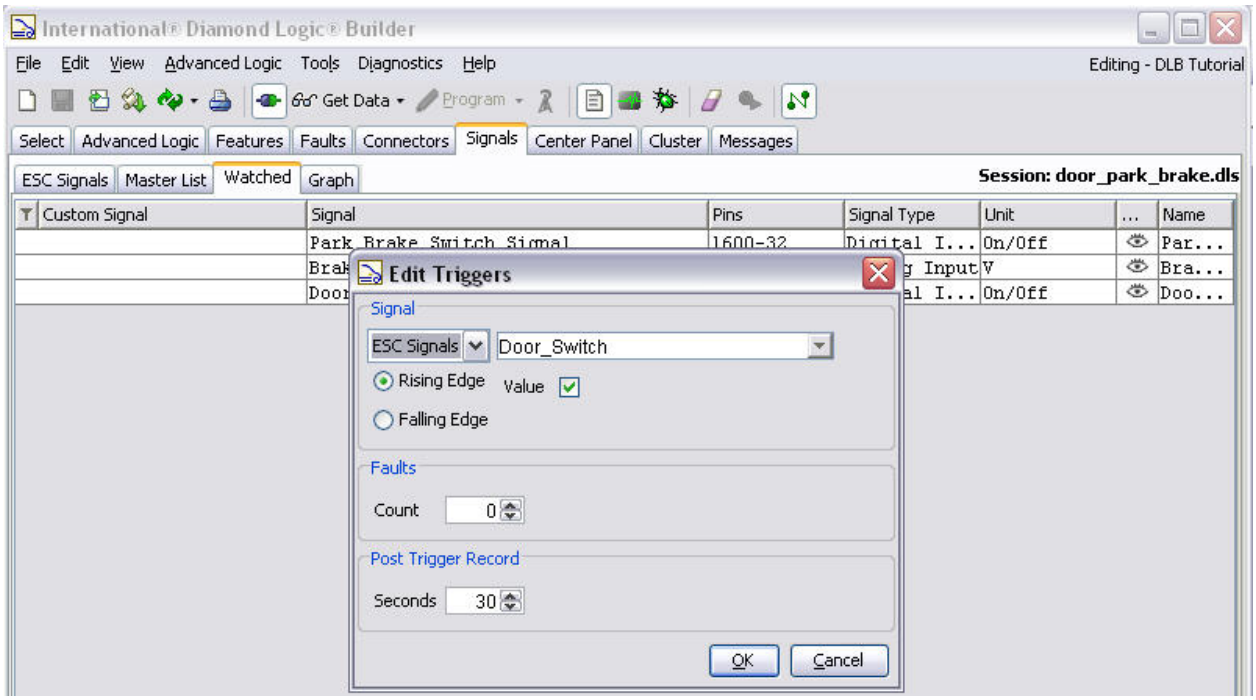
The graphing screen view shows data formatted in specific scaled data views, i.e. volts, pressure, digital ON/OFF signals shown as a 1 or a 0. The graphing screen is divided into as many views as is required to display all the data types. Therefore, it is desirable to keep the number of signal types watched to three or less. All signals of a given data type will be displayed on the same graph. Therefore, the user should minimize the number of signals that are watched on any single graph. The graphical recorder is able to record a single new data point every 50 milli-seconds (0.050 seconds). Therefore, it is important to minimize the total number of signals watched to less than ten to maintain a close representation of the real time graphing of the signals. Watching more than ten signals will result in possible missed signal transitions on the graph, plus the graph will be hard to read.

Using the TRIGGER Function

Triggers allow selected signals to be watched in a graphical format when certain conditional events have occurred. Events can be set to trigger on and/or off automatically. Data can be viewed and logged.
Triggers are used to detect a condition and mark it on the graph. Triggers also stop the recording on the graph after a specified amount of time so trigger condition does not get lost. If you kept recording forever the trigger would be lost 10 minutes after it fires because DLB will only keep a maximum of 10 minutes of data. The recorder must be started to begin the trigger process. The system will begin recording even though the trigger event may not have occurred yet. When the trigger does occur, the graph will be marked with a start line. The recording will continue until the stop condition occurs.

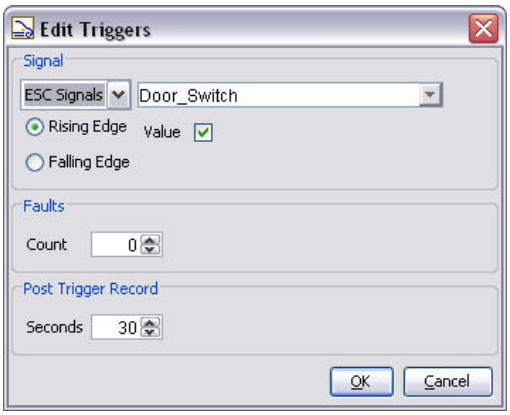
Setting Up A Trigger

Open the EDIT TRIGGERS pull down menu under the diagnostic main menu. See the Edit Trigger menu figure below.



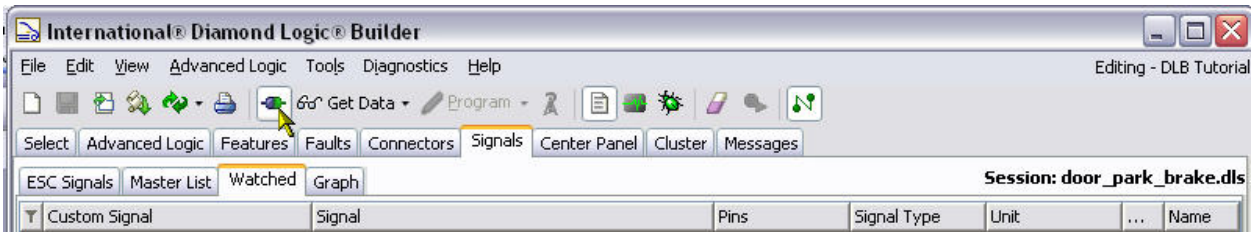
The Edit Trigger menu provides a choice to select signals from three categories; ESC Signals, Custom Signals or Master List. Use the pull down menu beside the selected signal category to choose the desired signal type. The trigger can be set up to detect when the signal goes active (Rising Edge) or when the signal goes inactive (Falling Edge). The trigger may be delayed until the occurrence (Fault) has occurred after a specified number of counts. Finally the trigger may be set to stop recording after a specified time.

Once a signal is selected, the trigger may be set to fire when a specified value has been detected. The following example shows that a trigger has been set to fire when the voltage exceeds 11 volts. The trigger will stop recording 5 seconds after the trigger event occurs.

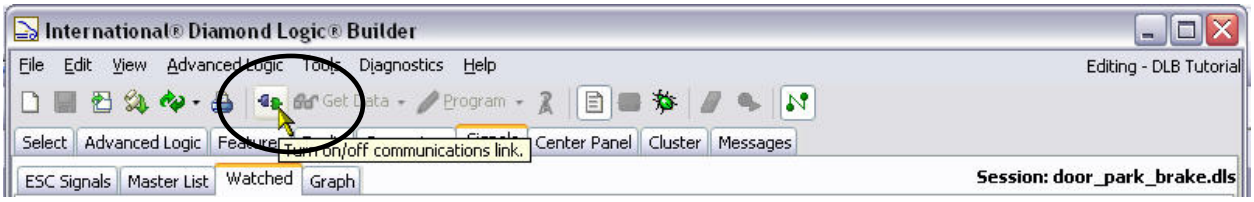


SECTION 17 How do I close the Diamond Logic® Builder program?

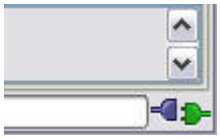
If connected to a vehicle, disconnect link. Go to the Tool Bar and click the Communications Link icon.



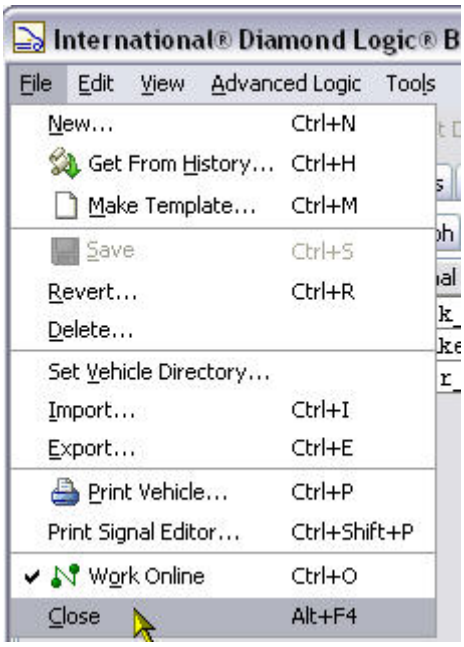
The Tool Bar will appear with the icon indicating disconnected.



The Communications Link icon in the lower right hand corner should also indicate disconnection.



There two options for ending the session. The first is to select File from the Menu Tool Bar and click on the Close item.



The second option is to click on the Close icon in the upper right hand corner of the Title Bar. Both options will end the session.

APPENDIX A –How do I install and uninstall the Diamond Logic® Builder software?

INSTALL

Minimum system requirements to load and run the Diamond Logic® Builder program:

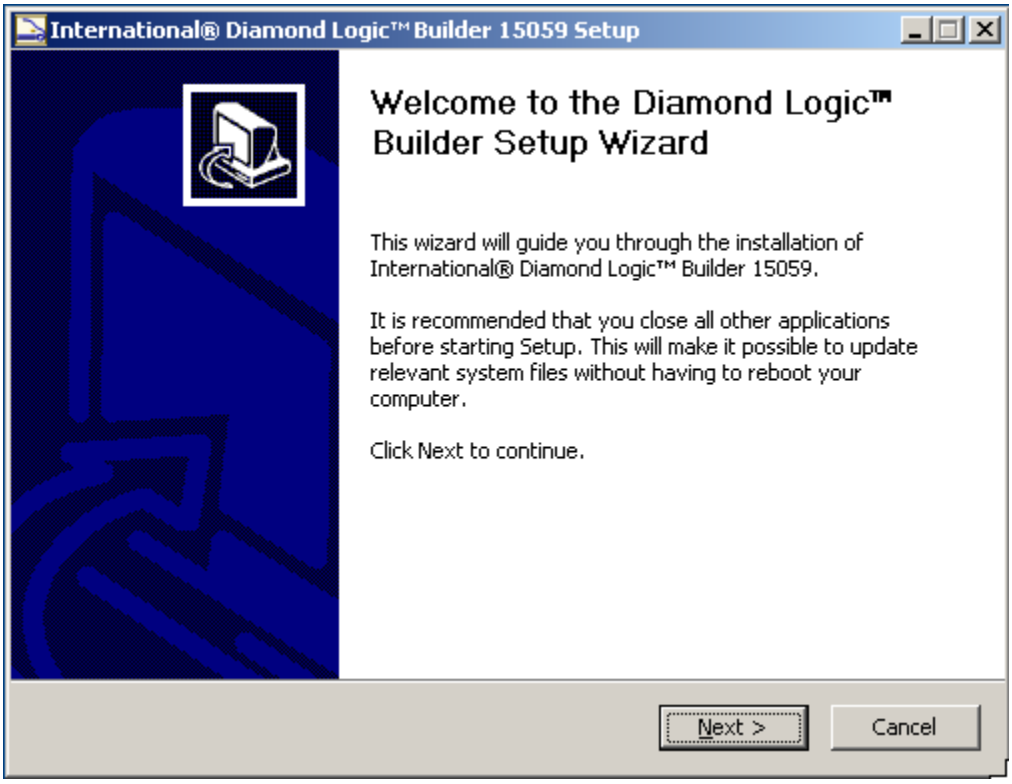
- Pentium® III class processor or greater
- 500 MHz processor or faster
- Windows 2000® or greater
- 256Meg of RAM minimum. 512Meg recommended
- An Internet connection through a dial-up modem or Ethernet connection
- An RP1210A device (IC3 or IC4 Com cable, International® wireless cable or
- International® J1939 cable)

NOTE: International suggests the use of a Pentium IV processor with a minimum speed of 1GHhz for best performance. Improved system performance will occur with the installation of increased RAM.

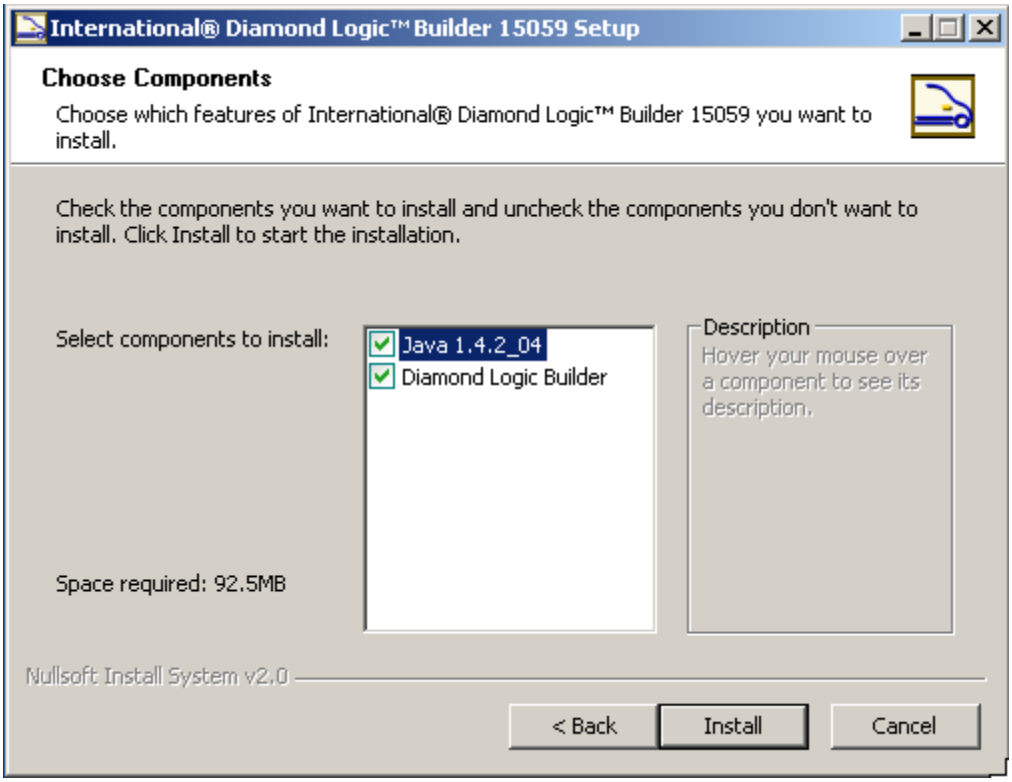
It is strongly recommended that all Terminate and Stay Resident (TSR) programs like the Quicktime® program, CD player programs or Pocket PC programs be terminated prior to loading or starting the Diamond Logic® Builder software. These programs interfere with the efficient operation of the Diamond Logic® Builder program and can cause errors reading and programming the ESC.

The Diamond Logic® Builder program is distributed on custom CDs. The installation is auto run from the CD after insertion. It loads the program and supporting libraries.

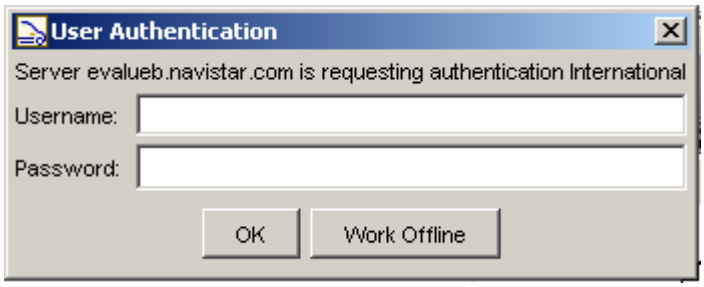
The CD has a Setup Wizard that simplifies the loading of the Diamond Logic® Builder software.



A menu allows the user to choose what parts to installed. This includes the Java™ runtime environment and the Diamond Logic® Builder program.



First time users will be prompted to fill in the information in the pop up User Authentication dialog box.



Once installed, run the program the first time while connected to the network. This gets the latest updates and allows the program to operate.

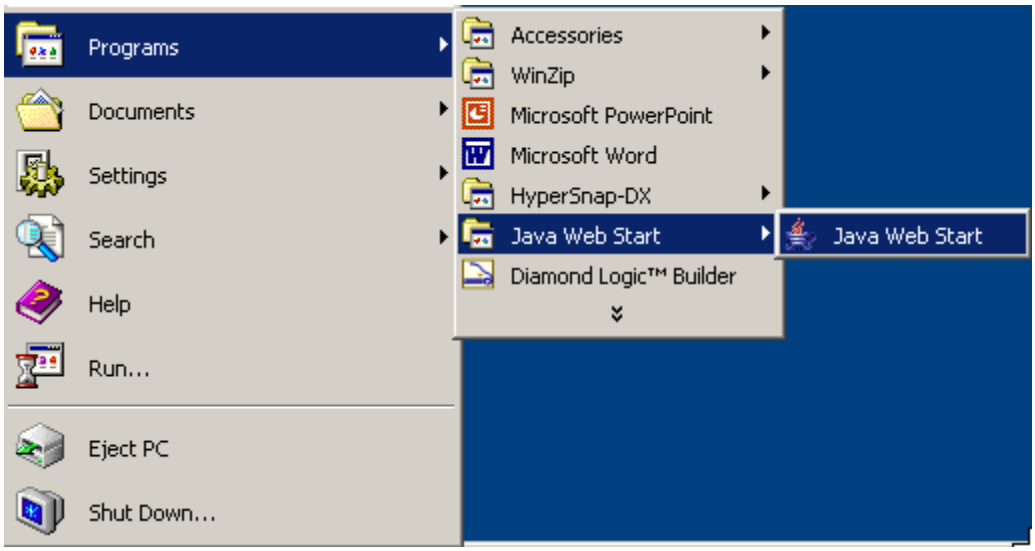
NOTE: The Diamond Logic® Builder program will not function if the user has not logged in at least once while connected to the network. The user may need to consult with the technical computer support staff if the Diamond Logic® Builder program cannot connect to the International site. Error messages will be generated if connection to International fails. Your Internet firewalls must be configured to allow two-way communication to International at the following website:

https://evalueb.internationaldelivers.com/dlb/dlb

UNINSTALL

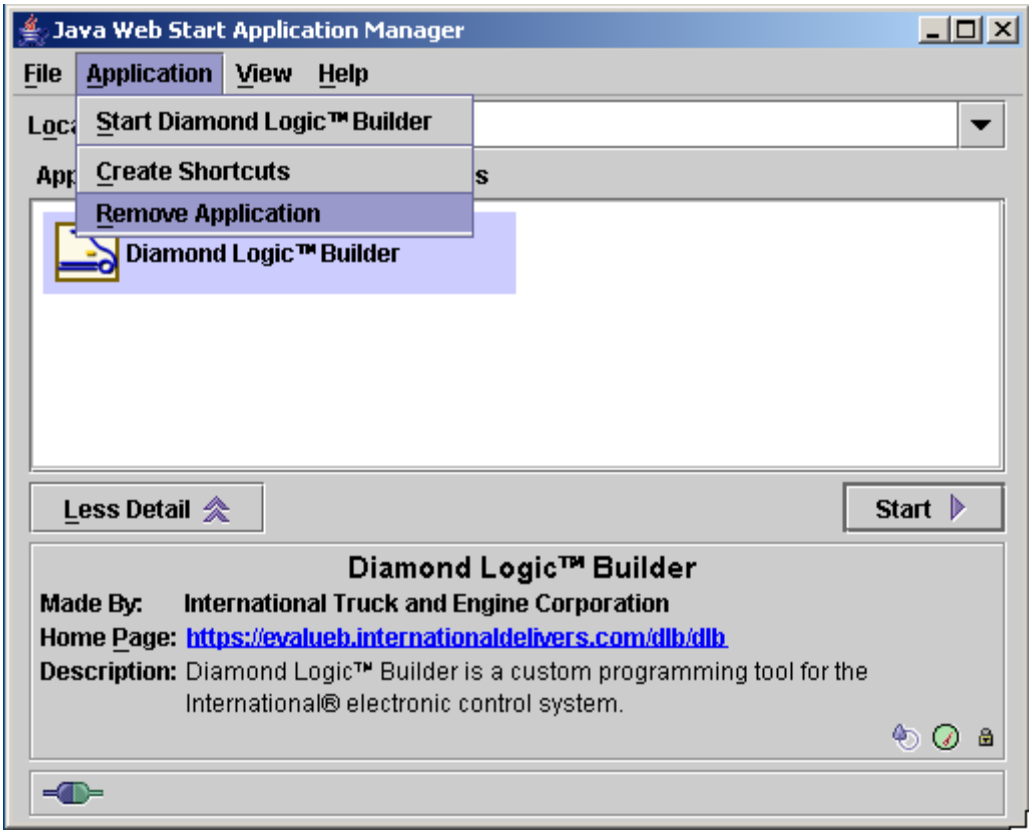
To uninstall the Diamond Logic® Builder software first run Java™ Web Start using the desktop icon

or from the Start/Programs menu.

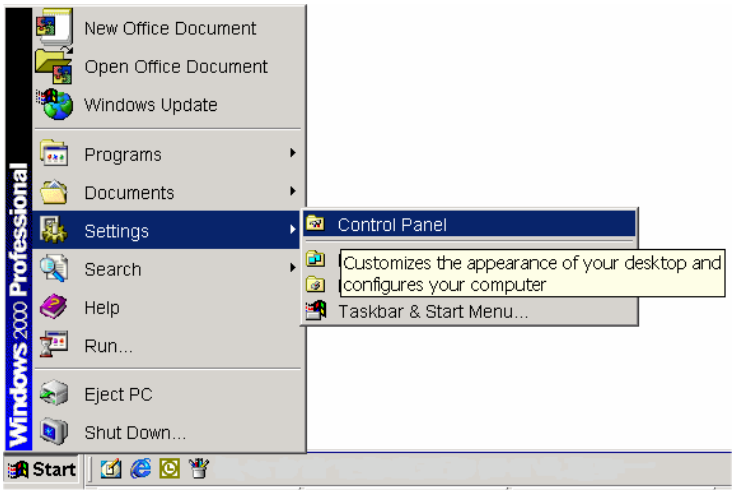


The Java™ Web Start logo window will appear followed by the Application Manager.

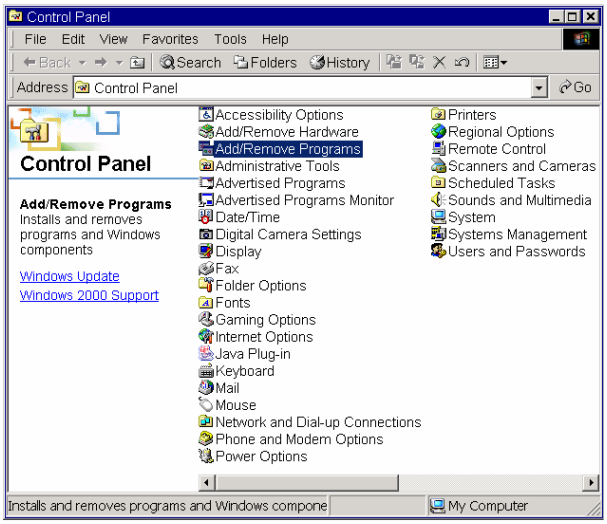
In the Application Manager is the Application menu. In this menu is the Remove Application option, selecting this option will remove the Diamond Logic® Builder program.



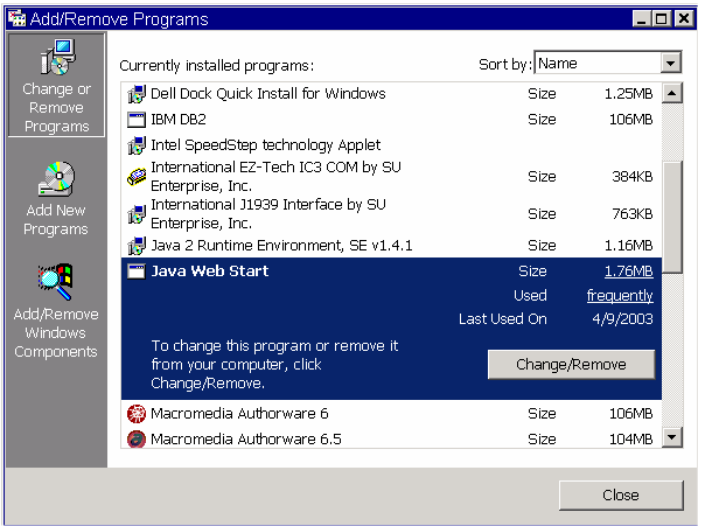
Java™ Web Start can be removed from the normal Start, Control Panel, Add/Remove Programs window. Only do this after performing the Remove Application option in the Application Manager as described above or orphaned files may be left on your system.



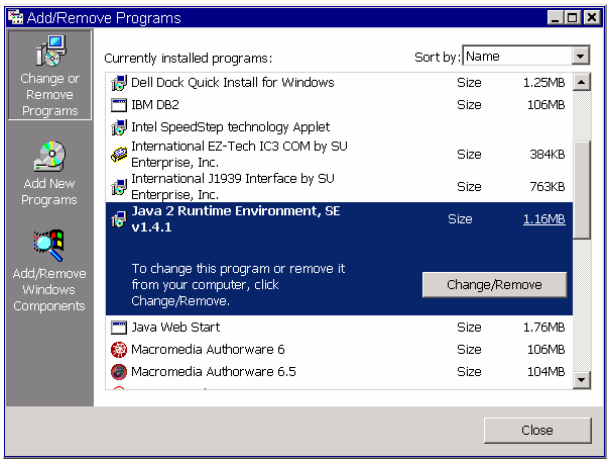
Select Add/remove Programs from the listing.



Find and select Java Web Start and click Change/Remove.



To completely remove Diamond Logic Builder, the user must also remove the Java 2 Runtime Environment, if installed. Find and select the Java 2 Runtime Environment and click Change/Remove.



APPENDIX B – Acronyms

ABS – Anti-lock brake system

AMP -- Ampere

ATC – Automatic Traction Control

BOC -- Back of Cab

DLB – The Diamond Logic® Builder software

EGC – Electronic Gauge Cluster

ESC – Electronic System Controller

FET -- Field Effect Transistor

FR -- Front

GA -- Gauge

GND -- Ground

HVAC – Heating, Ventilation and Air Conditioning

HYD -- Hydraulic

I/O – Input/Output

ICAP – International Configuration, AFC and Programming Tool

IGN -- Ignition

INTUNE™ – Trademark for International's diagnostic software.

ISIS® – Trademark for International's website that provides service and diagnostics information.

MSVA – Modular Solenoid Valve Assembly (also know as RATM in other areas)

PDC -- Power Distribution Center

RAM – Random Access Memory

RATM – Remote Air Solenoid Module

ROF -- Rear of Frame

RPM – Remote Power Module

RR -- Rear

SW -- Switch

VIN – Vehicle Identification Number

VSS -- Vehicle Speed Sensor

APPENDIX C – Contact Information

International Truck and Engine maintains a customer service technical support line for assistance with Advanced Logic and programming issues. Please use the following number to contact tech support:

1-800-336-4500 option 2 then option 3

APPENDIX D – Do's and Don'ts

Do's

1. **Test all designs thoroughly before selling equipment controlled by Diamond Logic® Builder programming. Exercise inputs and outputs under ALL possible combinations and conditions. Someone in addition to the advanced logic writer should test the design on the vehicle with the equipment that is to be controlled with the Diamond Logic® Builder software.**

Don'ts

1. **Do not try to program a vehicle with the ignition key in the run position. There is too much data traffic on the J1939 data link and the process will most likely fail with a time out error.**

INFORMATION

4. **The user ID is attached to each VIN configuration file when the user programs a vehicle. Adding / deleting features or changing programmable parameters is the user's responsibility. International Truck and Engine Corporation shall not be liable for any consequential warranty or equipment damage resulting from the users programming efforts.**

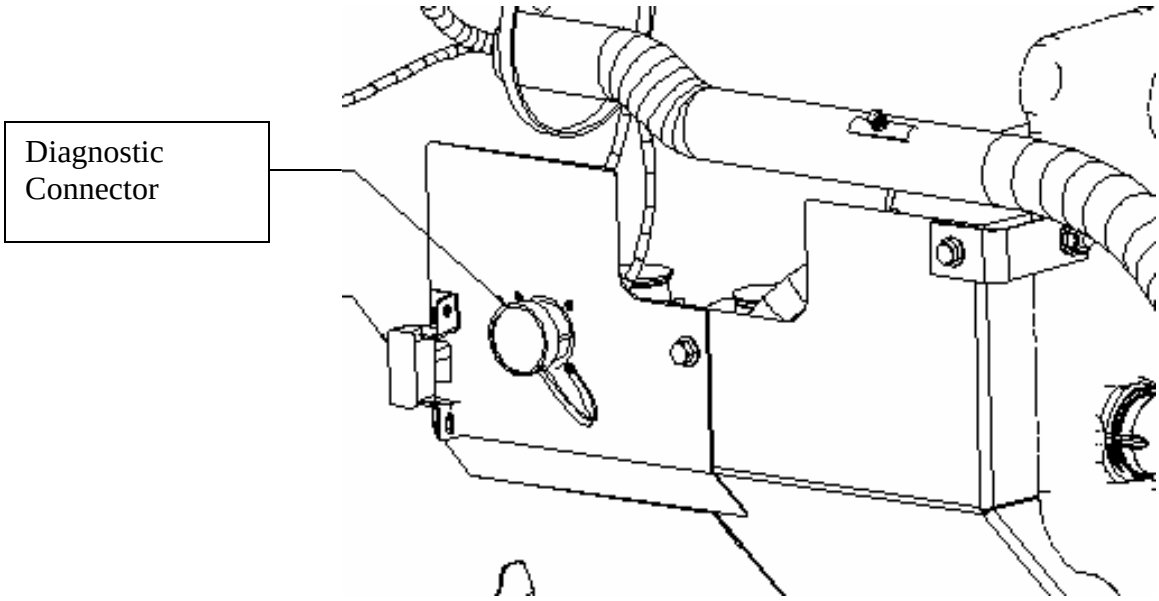
5. **Diagnostic fault codes will only be viewable on the FAULT screen while the ignition key is in the run position. The engine does not need to be running to view the ESC codes.**

6. **The Diamond Logic® Builder program will not show fault codes from the engine, transmission or Anti-Lock Brake systems. Use the diagnostic program provided by the power train component supplier to diagnose those systems.**

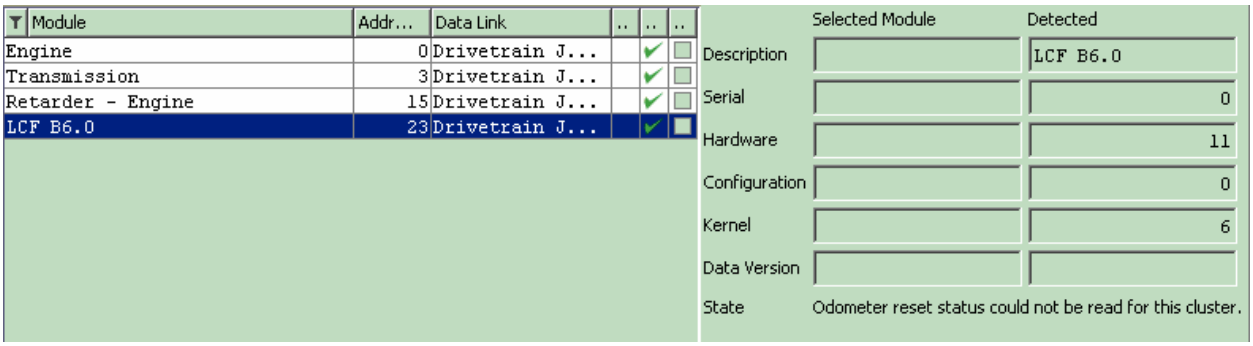
7. **When diagnosing the gauge cluster with the Diamond Logic® Builder program the pointers may not be stable. The pointers may be steered to zero intermittently. This is normal. Do not replace the gauge cluster due to this anomaly. It is important that the user can steer the gauge to a nominal value and that that the pointer does not stick or jump in the process.**

APPENDIX E – DLB support for CF Model Trucks?

DLB can be used to set the Odometer Value within the cluster and can drive the J1939 driven gauges (Speedometer, Tachometer, and Coolant Temperature Gauge). It cannot turn on warning lights or indicators, nor can it exercise the fuel gauge.

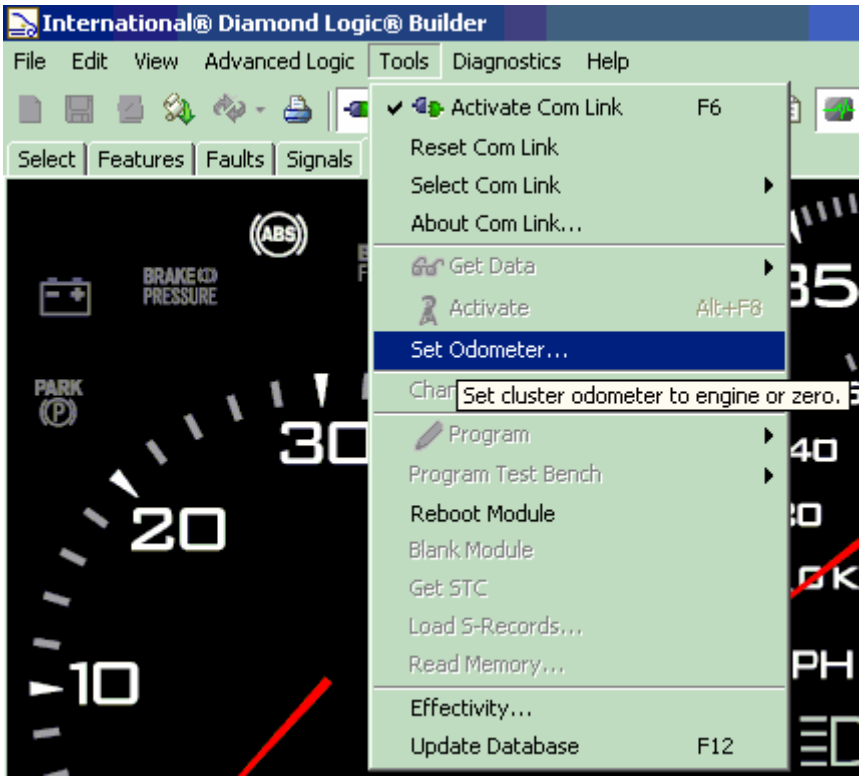


After the interface cable is connected to the diagnostic connector, a connection status bar should start to scroll across the bottom of the DLB display. After the vehicle information has been downloaded, LCF information will occupy the Detected window.

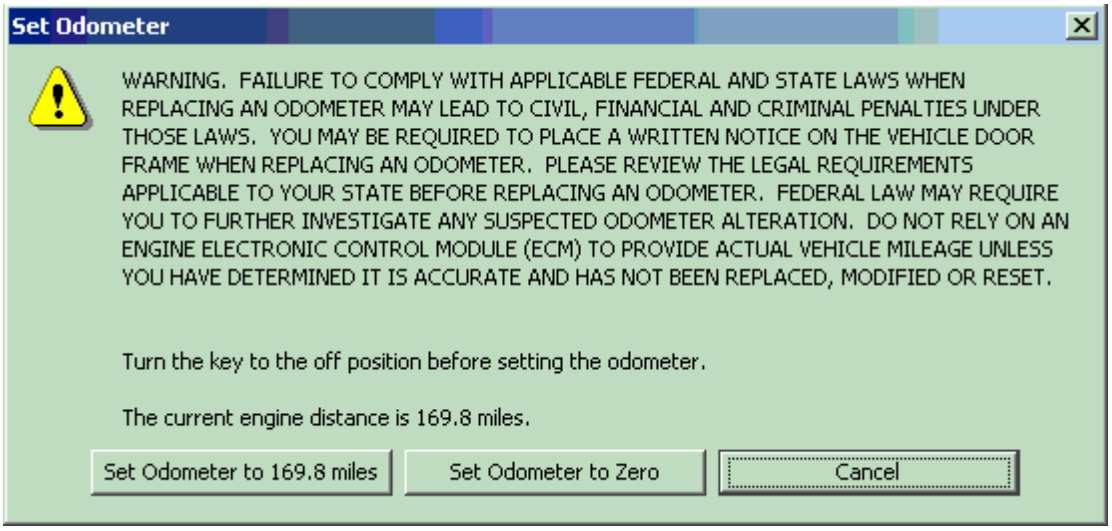


To test the Gauges, click on the diagnostic mode icon then click on the LCF Instrument Panel tab. The LCF cluster will be displayed. The gauges with red dial indicators can be tested by clicking and dragging the indicator.

The LCF odometer can be set to match the mileage in the engine controller or to zero. To access this option click Tools on the menu bar. This will display a dropdown containing the option “Set Odometer…”.



Clicking on “Set Odometer…” will open the Set Odometer window and display the warning below.



Read and follow the instructions in the warning then select the appropriate option for setting the odometer.

APPENDIX F – DLB support of the AWARE SM Vehicle Intelligence Module

The DLB software must be used to activate the AWARE Vehicle Intelligence Module.

DLB can also be used to program the AWARE Module. Templates have been developed to simplify programming the module for specific applications.

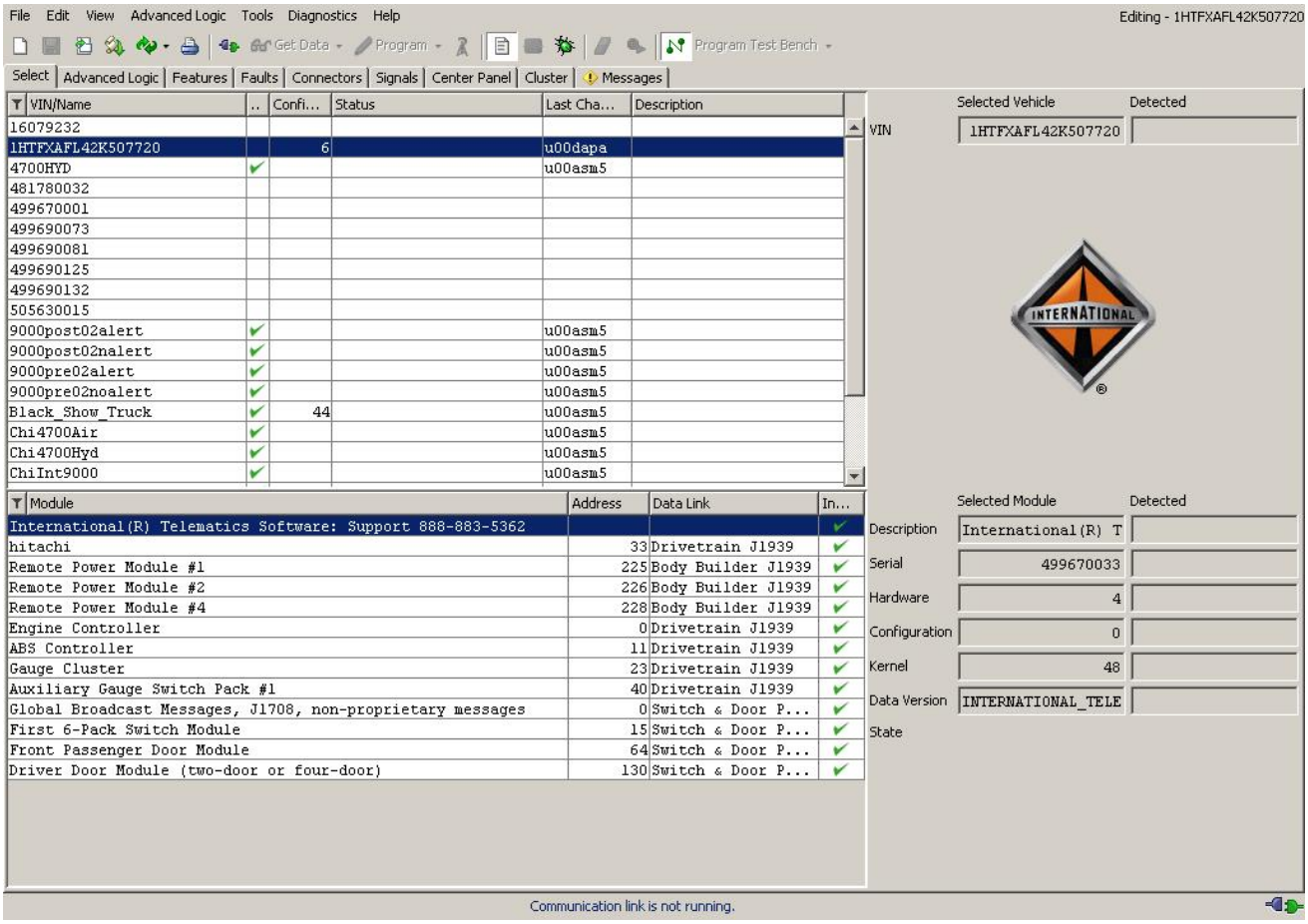
Detailed information regarding AWARE is available on the AWARE website:

https://evalue.internationaldelivers.com/customer/telematicscustomer/telwcmsg

Module Activation

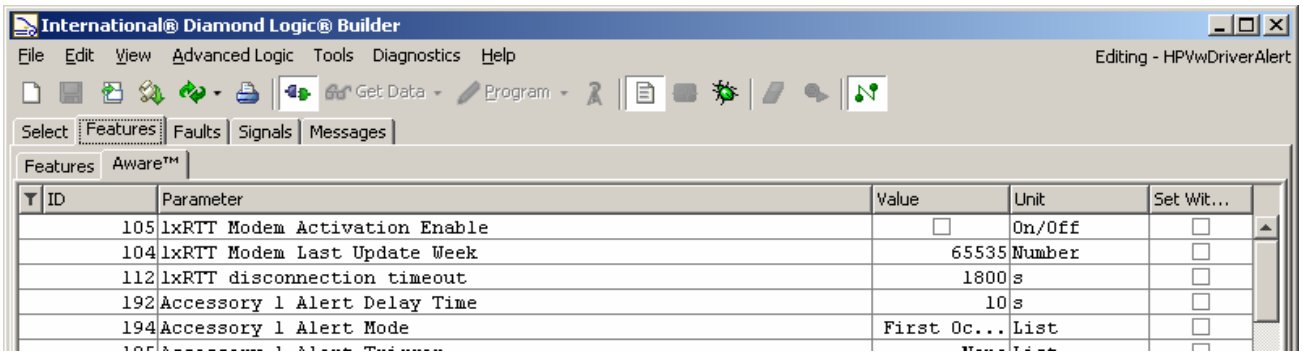
Icon	Description
	Activate or Deactivate the AWARE Module

Module Selection



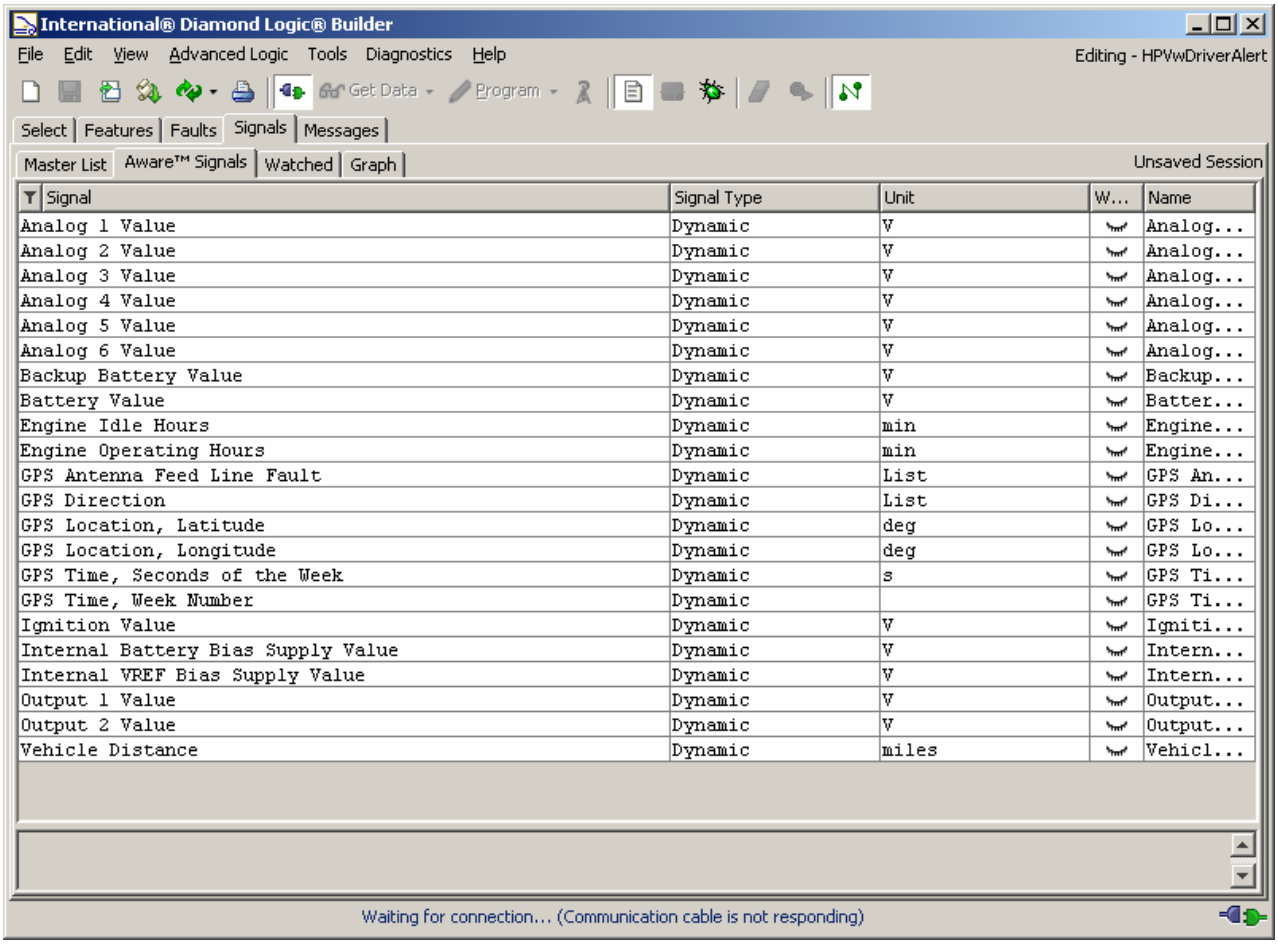
Features

The AWARE feature tab can only be viewed when an AWARE Module or an AWARE Template are selected.



Signals

The AWARE signals tab can only be viewed when a VIN with an AWARE Module or an AWARE Template is selected.



Signal	Signal Type	Unit	W...	Name
Analog 1 Value	Dynamic	V		Analog...
Analog 2 Value	Dynamic	V		Analog...
Analog 3 Value	Dynamic	V		Analog...
Analog 4 Value	Dynamic	V		Analog...
Analog 5 Value	Dynamic	V		Analog...
Analog 6 Value	Dynamic	V		Analog...
Backup Battery Value	Dynamic	V		Backup...
Battery Value	Dynamic	V		Batter...
Engine Idle Hours	Dynamic	min		Engine...
Engine Operating Hours	Dynamic	min		Engine...
GPS Antenna Feed Line Fault	Dynamic	List		GPS An...
GPS Direction	Dynamic	List		GPS Di...
GPS Location, Latitude	Dynamic	deg		GPS Lo...
GPS Location, Longitude	Dynamic	deg		GPS Lo...
GPS Time, Seconds of the Week	Dynamic	s		GPS Ti...
GPS Time, Week Number	Dynamic			GPS Ti...
Ignition Value	Dynamic	V		Igniti...
Internal Battery Bias Supply Value	Dynamic	V		Intern...
Internal VREF Bias Supply Value	Dynamic	V		Intern...
Output 1 Value	Dynamic	V		Output...
Output 2 Value	Dynamic	V		Output...
Vehicle Distance	Dynamic	miles		Vehicl...

INDEX

ABS 9, 44, 121
Acronyms 121
Add or Remove a Feature 76
Advanced Logic 10, 18, 21, 23, 24, 33, 34, 36, 37, 47, 52, 69, 72, 74, 81, 86
Advanced Logic Dropdown Menu 21, 23
Advanced Logic Tab 21, 23, 33, 34, 37
Anti-Lock Brakes 6
AWARE 22, 26, 127
Body Builder 81
Body Equipment 4, 7
Center Panel 101
Center Panel Tab 60
CF Model Trucks 124
Cluster Tab 61
Column Headings 28, 29, 34, 36, 39, 53, 65
COM port 16
Connectors Tab 46, 89
Custom Signals Sub-Tab 54
Diagnose 4, 22, 44, 81, 94, 95
Diagnosing 94, 102
Diagnosing Fault Codes 104
Diagnostics 11, 21, 26, 33, 100, 102
Dropdown Menus 17, 25
Edit Dropdown Menu 20
Electrical System Controller 6, 10
Electronic Gauge Cluster 6, 8, 121
Engine Controls 6
ESC 6, 8, 9, 10, 16, 32, 43, 46, 68, 76, 98, 99, 100, 121
ESC Signals Sub-Tab 54
ESC Sub-Tab 43
Faults Tab 44
Feature 4, 39, 40, 43, 70, 76, 77, 79, 80, 83, 85
Features Tab 38, 39, 40, 41, 42, 43, 76, 82
Filter Icon 28
Gauge Cluster 102
Get Data 22, 68
Graphing 111
Guage Locations 88
Help Dropdown Menu 24
HVAC 6, 8, 121
IC3 Com 14, 15, 92
IC4 USB 13, 14
ICAP 4, 121
Icons 25
INSTALL 115
Install and Uninstall 115
Interface Cable 14, 15, 16, 92
Interlocked 98
INTUNE 121
ISIS® 81, 121
J1939 9, 14, 16, 45, 53
Ladder Diagram 35
Ladder Logic 33, 100, 101, 105
Logic Block 33, 34, 101
Logic Blocks 33, 34, 37, 69, 92
Master List Sub-Tab 55
Menu Bar 18
Messages Tab 62, 63, 65
Module Detection 104
Move Switches 87, 88
Multiplexed 4, 6
Multiplexing 4, 5, 6
Override 98, 100, 102
Parameter 38, 40, 45, 78, 83, 84, 85, 92
Parameters 19, 28, 40, 41, 43, 79, 85, 92, 94
Program a Vehicle 73, 92
Programmable parameter 20
Programmable Parameter 40, 75, 79, 80, 82, 83, 84, 86
Programmable Parameters 78, 85
Programming 4, 24, 26, 33, 34, 72, 81, 86
PTO’s 7
Remote Air Solenoid Module 6, 7, 121
Remote Power Module 6, 7, 46, 121
Replacement ESC 92
Re-programmed 92
Revert 80
Rocker Switch Packs 6, 8
RPM 7, 9, 46, 47, 90, 91, 98, 99, 101, 121
Select Com Link 14
Select Tab 27, 28, 29, 76, 94
Sessions 107
Shortcuts 25

Signals Tab 52, 53, 98, 99, 105
Simulate 100
Simulate Mode 26
Status 29
Switch Pack 102
System Controller 53
Tabs 17, 27, 28, 75
Template 20, 25, 29, 32, 33, 40, 69, 70, 71, 72, 73, 74, 75, 76, 78, 80, 83, 86
Toolbar 17, 25, 94, 127
Tools Dropdown Menu 14
Transmission Controls 6, 9
Triggers 111, 112
Troubleshooting 94
UNINSTALL 118
Variable List 37
Vehicle configuration 72, 81, 86
Vehicle Configuration 25, 26, 66, 67
View Dropdown Menu 21
VIN 29, 30, 32, 66, 67, 70, 76, 83, 86, 92, 121
Watched Sub-Menu 107, 108
Watched Sub-Tab 55
Work Online 67, 68